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OBSTRUCTIVE JAUNDICE IN EARLY INFANCY

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Jaundice is common in newborn infants. It is probable that 40% of infants have a serum-bilirubin level of at least 4 mg. per 100 ml. during the first week of life. In the majority jaundice is mild and transient although not strictly 'physiological', but in others it is of serious import because of the underlying cause and/or the risk of kernicterus.

Jaundice in infancy is conveniently subdivided into non-obstructive and obstructive. In non-obstructive jaundice unconjugated bilirubin is raised and this is the substance which is toxic to the basal ganglia of the brain. It is twice as common as obstructive jaundice (Table I) and not of great concern to the surgeon apart from the assistance he can give with exchange transfusions.

TABLE I. JAUNDICE IN THE NEWBORN—144 CASES

Non-obstructive—93
- Functional immaturity of the liver.
- Haemolytic disease of the newborn.
- Congenital spherocytosis.
- Congenital familial non-haemolytic jaundice.

Obstructive—51
- Congenital atresia of bile ducts.
  - Extrahepatic.
  - Intrahepatic.
- Extrinsic obstruction.
- Cystic fibrosis of pancreas.
- Galactosaemia.
- Infections:
  - Bacterial.
  - Spirochaetal.
  - Herpetic.
  - Congenital hepatitis.
  - Cytomegalic inclusion disease.
  - Toxoplasmosis.
- Haemolytic disease with inspissated bile.

In obstructive jaundice conjugated bilirubin is raised. This substance is derived from bilirubin which has been conjugated by bilirubin glycuronyl transferase in the liver cells and is elevated in both bile-duct obstruction and parenchymal liver disease. The commonest cause of obstructive jaundice in young infants is biliary atresia (Fig. 1) which is of great concern to the surgeon. The other causes are mainly non-surgical (Table I), but difficulties arise in the differential diagnosis. This applies particularly to congenital or neonatal hepatitis and the inspissated-bile syndrome. Indeed, it has even been suggested by some that the 3 conditions, biliary atresia, neonatal hepatitis, and the inspissated-bile syndrome may be different manifestations of the same basic disorder. Jaundice prolonged beyond the second or third week is usually obstructive and caused by one of these 3 conditions.

Most workers still favour the viral nature of neonatal hepatitis. It is assumed that the virus can cross the placental barrier and that, although the mother has subclinical infection, the baby may have obvious clinical jaundice. In severe forms of this disease in the infant, total biliary obstruction may occur, and the empty, collapsed extrahepatic bile ducts are often so minute that they may not be recognized as such. It is in these patients that the differentiation from atresia becomes extremely difficult, and some workers even have suggested that the primary lesion is a congenital maldevelopment of the intercellular bile canaliculi leading from the liver cells to the bile channels with secondary atrophy of the ducts.

Since the original description of the inspissated-bile syndrome in 1935, the concept of this condition has gradually changed. There are, however, a very small number of infants with haemolytic disease who remain jaundiced for several weeks. The main pigment in their blood is bilirubin glucuronide which becomes elevated because of blockage of the intercellular bile channels by dark, inspissated bile. The portal tracts are normal, as are the main bile ducts, and the jaundice usually clears without treatment.

The generally accepted view of the aetiology of biliary atresia is that it is caused by an arrest of development during the solid stage of bile-duct formation. The possibility exists, however, that it may represent the end result of foetal hepatitis with sclerosis of the extrahepatic ducts, akin to cholangiohepatitis or cholidochitis found in adults. There is definite evidence that the biliary tree is still developing in the neonatal period and some grounds for believing that the atretic process may progress after birth. Many believe that intrahepatic atresia is a viral hepatitis which has occurred *in utero* or early in the neonatal period.

It is agreed that no single clinical feature or laboratory test, nor any combination of signs or battery of tests, will regularly distinguish between biliary atresia and neonatal hepatitis. All too often the final diagnosis has to be made at laparotomy or even at autopsy. In this report the clinical

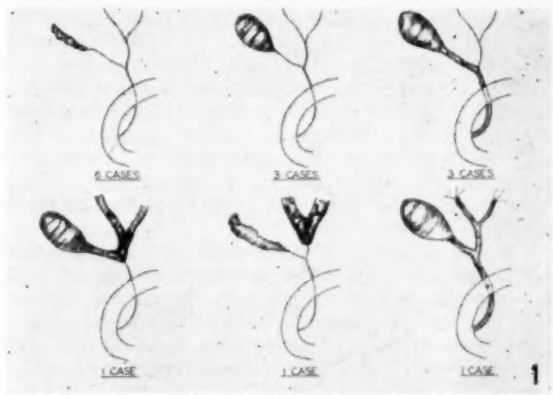


Fig. 1. Anatomical types.

features and laboratory data of 15 proved cases of biliary atresia are compared with the findings in 15 patients with hepatitis who developed jaundice before the age of 3 weeks. This analysis confirms earlier reports and our clinical impression that differentiation of prolonged obstructive jaundice in infancy may be exceedingly difficult at times. Points of particular value in differential diagnosis will be discussed.

The patterns of biliary atresia encountered in our patients are shown in Fig. 1. There was one patient who had intrahepatic atresia. He is still alive at the age of 2 years, but in poor condition, with moderate jaundice, xanthomatosis of the skin, a large irregular liver, and recurrent haematemesis. The average age at death of patients suffering from intrahepatic biliary atresia is 5 years. Only 2 of the 14 patients with extrahepatic atresia had an anomaly that was amenable to surgical correction. One of these died of progressive biliary cirrhosis 3 months after operation. The other is alive and well with no jaundice 6 months after surgery. The average survival in 'inoperable' cases was 5 months, and several lived for 7—8 months.

Of the 15 patients with neonatal hepatitis, 6 are known to have died and 4 to have recovered completely. Five have failed to report for follow-up. Two of the 6 deaths were caused by intercurrent disease, 1 by acute liver failure, and 3 by progressive cirrhosis. The infant who died of acute liver failure was operated upon and surgery no doubt hastened the end. Two of the patients who have survived were operated upon for suspected biliary atresia. The original operative diagnosis was 'inspissated-bile syndrome', but in retrospect these cases have now been classified as infective hepatitis.

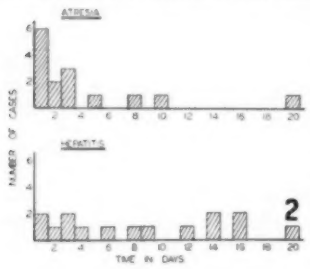


Fig. 2. Age at onset of jaundice.

Age at Onset of Jaundice (*Fig. 2*)

Although one would expect jaundice to be present from birth in biliary atresia, it has been stated that the diagnosis of atresia is unlikely in infants who become clinically icteric on the day of birth, and most paediatricians hold the viewpoint that recognizable jaundice on the first day of life is caused by haemolytic disease until disproved. However, a history of jaundice since birth may be obtained in about one-third of cases and this is so in our series (6 cases). Usually the jaundice is noticed during the first week, but not uncommonly 2 - 3 weeks elapse before it is dark enough to become conspicuous. The jaundice is usually persistent and progressive, although some parents have insisted that there are fluctuations in intensity.

It is usually said that the stools are always clay-coloured or white from birth, even though jaundice is noticed only later. We have not been so successful in obtaining an accurate history of acholia. Confusion often arises from staining of the stools by highly concentrated urine. Later the stool itself may be yellow from bile-stained succus entericus, saliva, and mucosal cells, and small amounts of stercobilin may be found on chemical testing. Nevertheless, persistent acholic, putty-like stools from birth are highly suggestive of biliary atresia, while dark stools rule out this diagnosis.

In the patients with neonatal hepatitis there was no significant difference in the age of onset and progression of jaundice. In two-thirds jaundice was noticed by the eighth day, and in all but 2 the stools were described as clay-coloured or white. However, fluctuations in the depth of jaundice and in the colour of the stools may occur and should be sought for as a differential point.

In all the patients of both groups the urine contained large quantities of bilirubin, but no urobilin. Absence of urobilin is to be expected in atresia, but it may occasionally be present in patients with hepatitis. Others have found urobilinogen in about one-third of infants suffering from atresia.

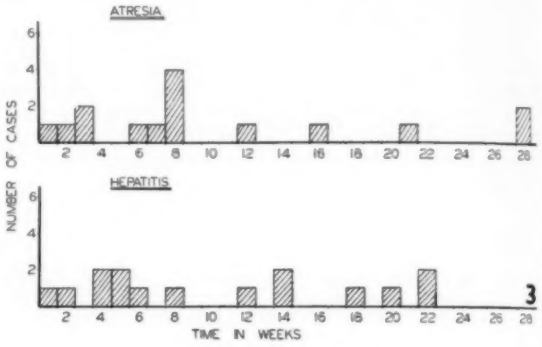


Fig. 3. Age on admission.

Age on Admission (*Fig. 3*)

There was no significant difference in the 2 groups, although in general the babies with biliary atresia tended to be in better condition and well nourished during the first 2 - 3 months. The older infants with biliary atresia tended to be below par, while some of those with hepatitis who were improving were in good condition. It should be remembered that the average duration of life of infants with extrahepatic biliary atresia is 5 months, and many may survive for 7 - 8 months. (In patients with intrahepatic atresia the children may live for several years.)

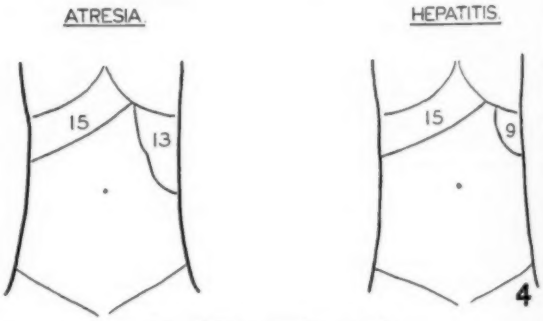


Fig. 4. Hepato-splenomegaly.

Hepato-splenomegaly (*Fig. 4*)

Enlargement of the liver was present in all the patients, but tended to be grosser in those with biliary atresia. Splenomegaly, often of considerable degree, was present in 13 of

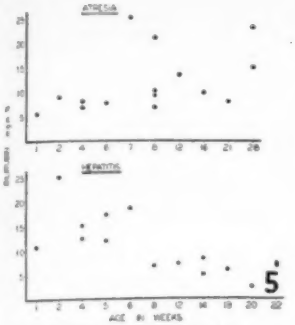


Fig. 5. Bilirubin on admission.

the infants with atresia. Among those with hepatitis the spleen was palpable in 9 only, often only just the tip being felt. This feature may thus be of some significance.

Serum Bilirubin

The total bilirubin levels at various ages on admission are shown in Fig. 5.

In biliary atresia values ranged from 8 to 25 mg. per 100 ml. There appears to be a slight rise in the mean values with age, but individual examples are glaringly out of line. In the hepatitis group the values were very similar, but showed a clear tendency to lower values with increasing age.

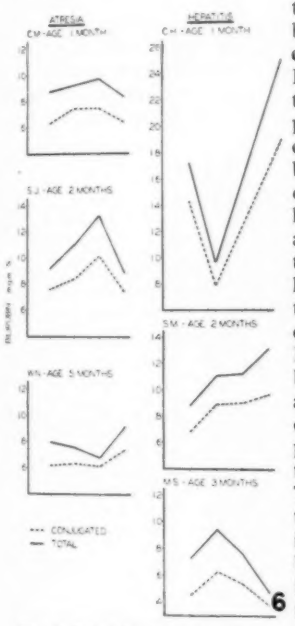


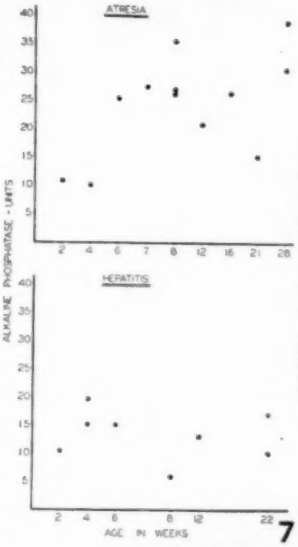
Fig. 6. Serial bilirubin levels.

Serial determinations of the conjugated and total bilirubin of 3 patients in each group are shown in Fig. 6. It is apparent from these graphs that no single pattern can be considered characteristic. However, in biliary atresia, over a period of 4 weeks, the bilirubin level shows no gross fluctuations and there is a general tendency to increase. Others have found an upward trend in two-thirds of the cases suffering from atresia. In hepatitis 3 patterns may be found, viz. constant over a period of 4 weeks, rapid deterioration, or rapid improvement—depending on the progress of the disease. The key point of differentiating hepatitis from atresia is the continued decline in bilirubin levels that occurs in favourable cases, but it requires a period of observation of at least 4 weeks to determine this, and the test is only a *fair* method of differentiation.

Liver-function Tests

The zinc-turbidity, thymol-turbidity and thymol-flocculation tests did not show any significant difference between the 2 groups. Grossly abnormal values were found in 3 of the patients with atresia and 5 of those with hepatitis. (They were all late cases.) Most of the high values occurred after the age of 3 months. Others have found these tests *fair to poor*, and the bromsulphthalein (BSP) tests have been of little value. Serum-cholesterol levels tend to be high in atresia, especially in the intrahepatic variety, but only in the late stages.

High alkaline phosphatase values, i.e. over 20 Bodansky units, were found in 7 patients with atresia and in none of those with hepatitis (Fig. 7). Levels above 30 occur almost



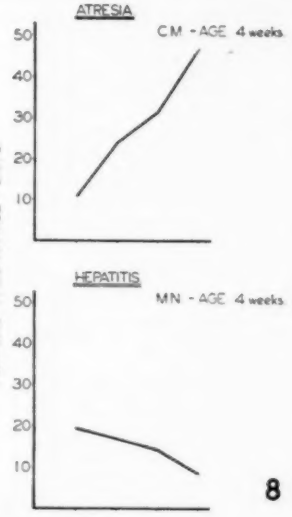


Fig. 7. Alkaline phosphatase on admission.
Fig. 8. Serial alkaline phosphatase.

exclusively in atresia, but in many cases the level is below 30. Furthermore, the patients with atresia tended to show a steady increase (Fig. 8), while many of those with hepatitis showed a significant decline over a period of 4 weeks. This test may, therefore, be of some value in selecting patients over the age of 2 months or after a period of observation of 4 weeks.

Serum-transaminase Levels

Transaminase studies (glutamic oxaloacetic transaminase and glutamic pyruvic transaminase) are of value in determining not only the extent of liver injury, but also the degree of parenchymal destruction, and may be of value in differentiating atresia from hepatitis.

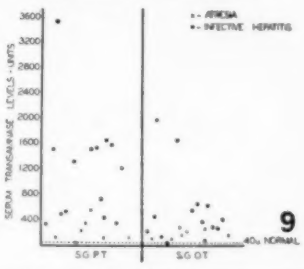


Fig. 9. Highest transaminase values—21 cases.

In Fig. 9 the levels in early cases of atresia and hepatitis are depicted. It should be noted that in hepatitis the levels are considerably elevated at the onset of the illness and then fall, while in atresia they are normal at the beginning and then rise to moderate heights only (Fig. 10). In general the levels in hepatitis are considerably higher than in atresia, especially in regard to SGOT. However, individual exceptions are common, and at about 2 months, when many patients are first referred to hospital, there may be no significant difference.

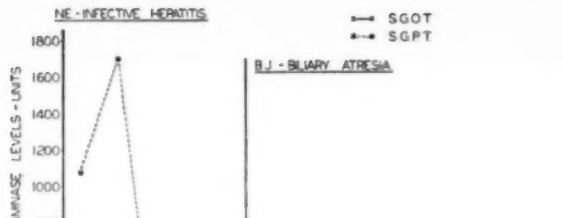


Fig. 10. Transaminases in jaundice.

Lathner and Smith from Durham University, report that the *transaminase/alkaline phosphatase ratios* show than in adults nearly ¾ of patients with hepato-cellular disease have a ratio of 7 or above, whereas only 7% with obstruction have ratios of 7 or above, and more than 50% have ratios of 3 or below. Among the latter higher ratios occur when biliary cirrhosis develops. These authors claim that with this method of assessment the diagnostic error is only 8%. We are still investigating the value of this ratio in newborn infants suffering from jaundice.

Bile in Duodenal Aspirate

We have performed this test in only a few cases. It may be helpful, especially if done under fluoroscopic control. If consistently negative, atresia is likely and exploratory surgery indicated. Duodenal intubation combined with BSP excretion and the use of magnesium sulphate to dislodge 'inspissated bile' may be of more value.

Radioactive Rose-Bengal Test

Robert Brent, of Jefferson Medical College, Philadelphia, has drawn attention to the use of radioactive Rose Bengal in the evaluation of infantile jaundice, but we have not yet had the opportunity of using this test. In biliary atresia stool excretion is less than 2% of I^{131}, administered while urinary excretion is high. In hepatitis, on the other hand, stool excretion is usually well above 4% while urinary excretion is low.

Liver Biopsy

To differentiate histologically between biliary atresia and neonatal infective hepatitis is by no means easy in the individual case. All the features which have been stressed by various authors as favouring a diagnosis of neonatal hepatitis may be found in patients with proved biliary atresia. However,

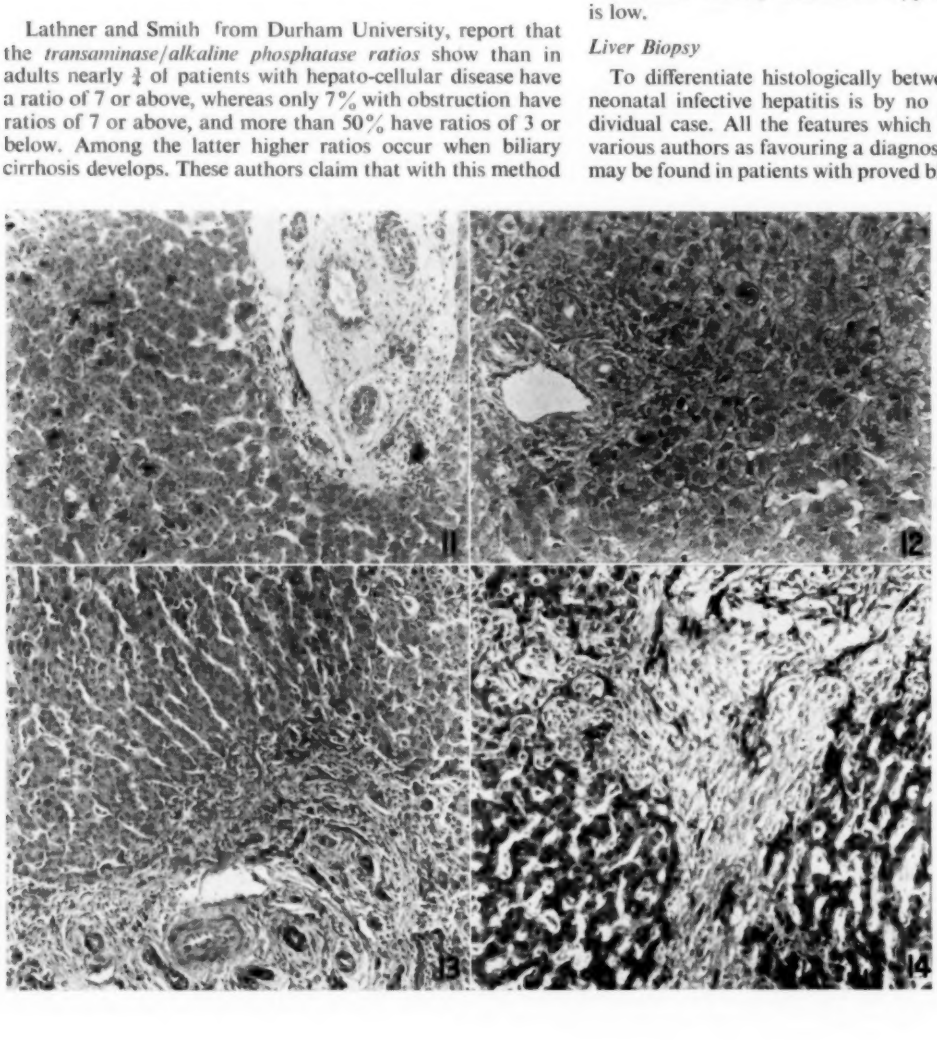


Fig. 11. Formal biopsy from a 4-week-old infant. Portal tracts are prominent for this age and signs of obstructions are far in excess of parenchymal damage. An early case of atresia.

Fig. 12. Formal biopsy from a child of 6 weeks with neonatal hepatitis. Note the extensive parenchymal damage in comparison to the relatively normal portal tracts. Obstructive signs are minimal.

Fig. 13. A proved case of atresia—here the position is more difficult. There is some parenchymal damage and also periportal fibrosis and bile-duct proliferation— the latter more marked, however, and histologically favouring atresia.

Fig. 14. Histological pattern in a late case of biliary atresia. In this case a well-established biliary cirrhosis is present.

some features are rather more common in hepatitis than in atresia, and *vice versa*, and it is our opinion that the relative preponderance of these features, weighed in conjunction with the duration of jaundice, provides the only feasible means of assessing the histology in the individual case.

Giant-cell formation, evidence of cell necrosis, and hydropic and eosinophilic degeneration may be present to the same degree in either condition, but it is our experience that these histological changes are present much earlier in the course of neonatal hepatitis than they are in atresia, and this may well be an argument in favour of early biopsy. The impression is also formed that these changes *ab initio* affect the parenchyma in a more haphazard and diffuse fashion in neonatal hepatitis than is the case in atresia, and that in atresia they are first seen in those parenchymal cells abutting on the portal radicles.

Perilobular fibrosis and bile-duct proliferation occur in both conditions, but seem to be established much earlier in patients with atresia, and are usually reasonably marked by the time that parenchymal damage of the types outlined above are established. In neonatal hepatitis, however, it is our experience that parenchymal damage usually precedes periportal fibrosis and bile-duct proliferation for some appreciable time. This does not make differentiation any easier, though, in patients presenting after jaundice, parenchymal damage has been of some duration.

The maximal situation of the bile thrombi and the situation of foci of inflammatory cells have not proved particularly helpful, nor has the presence of intracellular bile stasis.

In late cases where well-marked cirrhosis is already present, the histological differentiation would seem to be wellnigh impossible unless the cirrhosis is frankly biliary in type. Figs. 11-14, taken from our cases, illustrate some of these features.

Summing up from the histological standpoint and for the reasons stated, there is in our opinion little to lose and a great deal to be gained from early and adequate biopsy and, whereas we feel that both parenchyma and portal radicles must be adequately visualized, needle biopsy of the liver falls far short of a formal biopsy taken at laparotomy. Some claim that the biopsy specimen may be examined by frozen section, but most authors agree that this is expecting too much from the pathologist. It is our practice to perform a formal biopsy and to examine the specimen by paraffin section.

THE THERAPEUTIC PROBLEM

From the data given above it should be obvious that the differential diagnosis between biliary atresia and neonatal hepatitis during the first 2-3 months of life is often impossible on clinical and biochemical grounds. The principal rôle of the surgeon is to recognize and treat the children affected with atresia before the damage from obstruction has become irreversible. Numerous attempts have been made to decide the 'point of no return' as far as obstructive jaundice is concerned, but there is, as yet, no unanimity. It is agreed, however, that moderately advanced cirrhosis may be present at 2 months, and certainly at 3 months, and it has repeatedly been emphasized that prolonged delay before operation will prevent salvage of those infants with surgically correctible lesions because of progressive biliary cirrhosis. It is also felt by some that 'disuse atrophy' or chemical cholangitis over a period of 2-3 months may render a previously 'operable' condition 'inoperable', particularly if biliary atresia is in fact caused by some form of sclerosing cholangitis. Such a course of events in these tiny infants makes it evident that definitive therapy for atresia of the ducts must be carried out, preferably before 2 months of age and certainly before 3 months. Most writers recommend exploration at 4-6 weeks.

It should be remembered, however, that the diagnosis of biliary atresia at operation is a time-consuming performance which involves complete exploration of the lesser omentum and porta hepatis. This entails prolonged anaesthesia and inevitable trauma which, in a case of hepatitis, might tip the scale against survival. Indeed, it has often been reported that morbidity and mortality are greatly increased in patients with infective hepatitis who have undergone surgical exploration. In at least 1 of our patients death was precipitated by surgery, and postoperative intestinal obstruction is a common complication.

Another factor which must be seriously considered is that the collapsed, bile-free ducts of hepatitis may not be recognized at operation. This may result in an erroneous diagnosis of inoperable atresia or, worse still, in irreparable damage to the minute ducts during dissection. The surgical diagnosis of inoperability is far from easy and often inaccurate. This is supported by the fact that a number of spontaneous recoveries following negative exploration have been reported in the literature. Indeed, there are now about one-fourth as many reports of recovery following simple exploratory laparotomy as there have been following accepted corrective procedures. In this connection, it seems fairly clear that many cases of 'inspissated-bile syndrome' will clear up without surgery, and that the risks of anaesthesia and complete biliary exploration are not justified. Furthermore, it has been suggested that, because of the mortality and morbidity of surgical exploration, operation should not be carried out before the age of 5 or 6 months to allow those cases that would clear up spontaneously to do so and those that had undoubted atresias to manifest themselves by progressive signs of obstruction. Needless to say, this has not been met with general approval.

It is obvious that an accurate estimate of cure rate in biliary atresia is of fundamental importance. If an appreciable number of these infants can be cured by surgery, then the risks of a few unnecessary early explorations in patients who prove not to have biliary atresia are justified. A review of the literature, however, shows that only 20% have 'operable' lesions and only 8% are 'cured'.

Cholangiography

In response to the suggestion of 'the waiting game,' various authors have introduced the more expedient and briefer surgical procedure of liver biopsy and cholangiography at an early age to determine which patients are surgical candidates as opposed to those who have medical disease. This method has now been widely accepted and is used by us. The main advantage is that it involves minimal anaesthesia and surgical trauma and yet provides accurate information at a stage when liver damage is still minimal. It can be carried out with safety in infants of less than a month old, which is the optimum time to arrive at a definitive diagnosis.

The procedure may be carried out under local or general anaesthesia. A short transverse or muscle-splitting subcostal incision is made about an inch above the liver edge. This affords adequate exposure and protects against subsequent disruption. The subhepatic area and porta hepatis are in-

spected, but no dissection is done for fear of damaging minute bile ducts. If the gall bladder is absent or represented by a fibrous cord, it is probable that the child also has obliteration of the extrahepatic bile ducts. If a gall bladder is present, a small rubber or polythene tube is inserted into it and an immediate cholangiogram is taken, using 35% urodione. Only small quantities of dye should be used—we inject ½ ml. for the first plate and then ½ ml. more for each of 3 or 4 more plates. In either instance a deep wedge of liver is resected and the biopsy site oversewn. The subsequent management depends on the findings, viz:

Fig. 15. Specimen of a case of complete biliary atresia with secondary biliary cirrhosis.

1. No gall bladder present (Fig. 15).

If a frozen-section report on the liver biopsy can be obtained proceed immediately with exploration. If not, await result of report and then explore.

2. Gall bladder present.

(*a*) Dilated bladder, cystic duct and common hepatic duct, but no common duct. Explore immediately.

(*b*) Bladder and all ducts patent and not dilated. Remove the catheter. No further surgery required.

(*c*) Other.

Do not remove the tube, but bring it out through a small stab at the liver's edge and place it on drainage. Repeat the X-rays after 24 hours to see if any further ducts have filled and repeat the cholangiogram through the cholecystostomy tube if necessary. Await result of the liver biopsy before proceeding further.

It should be noted that cholangiography *via* the gall bladder is possible in only about half of the patients with atresia, and in about a third of these the true anatomical pattern may not be visualized because of the diminutive size of the ducts. It is for this reason that the tube is left *in situ* and further plates may be necessary. Furthermore, cholangiography in cases of hepatitis may fail to show up the ducts owing to their minute calibre and the presence of inspissated bile. It is, therefore, advisable to irrigate the ducts before injecting the dye and to take further plates if no ducts are visualized at operation.

It should be obvious that in many cases the final decision about exploration will depend on the pathologist.

SURGICAL TREATMENT

We do not propose discussing the details of treatment. Suffice it to say that exploration should be preceded by irrigation through the gall bladder with warm saline followed by injection of methylene blue to outline ducts that may be present. Adequate exposure (some even use a thoraco-abdominal approach) and extreme gentleness are of the greatest importance. Any bulging structure which may be a dilated bile duct should be aspirated with a fine needle—it usually turns out to be a vein! If no ducts are found in the lesser omentum or portal fissure, any depression in the hilus of the liver must be explored with a probe.

If an 'operable' condition is found, the duct or gall bladder should be anastomosed to the duodenum or to the jejunum Roux-en-Y. The anastomosis is usually best performed over a small tube which will dislodge and be passed in due course.

From time to time reports appear of ingenious methods of dealing with 'inoperable' cases. These include multiple punctures of the hilum of the liver to establish a biliary fistula; anastomosis of small bowel to a scarified area of liver; 'opening up' of the hilus of the liver with a valvulotome followed by hepatico-enterostomy; and Longmire's procedure. In some cases successes have been claimed, but it seems altogether reasonable to assume that, coincidental with such an operation, an overlooked common duct spontaneously opened and took over its normal function. None of these procedures have proved to be worth anything at all and the procedure of choice if no correctable atresia can be found, would appear to be to resist the therapeutic urge by leaving well alone and getting out. It should be remembered that the operative diagnosis is not infallible and that there are reports of at least 14 patients who were thought to be inoperable and given a hopeless prognosis, who have subsequently cleared their jaundice.

CONCLUSION

Congenital atresia of the bile ducts remains the darkest chapter in paediatric surgery. The aetiology is unknown, clinical diagnosis is at the best a good guess, laboratory tests often fail, the histopathology is variable, radiology is of limited value, and surgical exploration far from satisfactory. Above all, the results of treatment certainly leave a great deal to be desired. The correct management of the jaundiced infant calls for careful clinical assessment, integrated teamwork, expert surgical judgement, and a gentle surgeon.

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EDITORIAL : VAN DIE REDAKSIE

ASPECTS OF THE PHYSIOLOGY OF HEART FAILURE

There has been considerable advance in the last fifty years in our understanding of the chemical mechanisms and of the physico-chemical events that underlie the conversion of potential chemical energy to mechanical work in both cardiac and skeletal muscle.[1] It was evident in the early years that oxygen consumption and the metabolism of food materials such as carbohydrates were necessary for contractile activity of the heart and skeletal muscle. These metabolic processes were shown to have an indirect relationship to the contractile process. It was also shown that the breakdown of phosphocreatine was the chemical event supporting contraction. This in turn came to be regarded as indirectly involved, and the breakdown of adenosine triphosphate (ATP) to adenosine diphosphate (ADP), which accepts phosphate from phosphocreatine, was considered to energize the contractile mechanism.

It has long been known that a viscous protein 'myosin' can be extracted from muscle. This substance appeared to be the likely structural component and the working substance of the myofibril. With the knowledge of the chemical nature of this substance and of the energy source ATP, the concept arose that 'myosin' was a contractile enzyme deriving its energy from the hydrolysis of ATP. Experiments revealed remarkable reactions between 'myosin' and ATP.

Szent-Györgyi and his collaborators showed that 'myosin' was in reality a complex of two proteins, actin and myosin, which they called actomyosin. They regarded actin and myosin to be dissociated during rest, but combining on being stimulated, and with adsorption of ATP to change into the contracted state.

It has been known for very many years that the striations in muscle reveal something about the mechanism of contraction, but only in recent years has it become possible to attempt to correlate muscle chemistry with structure. Thin sections for electron microscopy and the specific extraction of actin and myosin from intact muscle fibres have enabled the Huxleys and their colleagues to localize the structural proteins in muscle fibre.[2,3] From their studies they proposed that in muscle contraction the wave of depolarization induces changes which permit the thin I filaments (isotropic band) to slide past the stationary and thicker A filaments (anisotropic band), thus producing shortening ; the thin filaments interdigitate with the thick filaments, and this is energized by the breakdown of ATP.

This knowledge of the chemistry of the normal contractile process, with all the new ideas and techniques, has been applied to studies of the defects in heart failure. It was Starling who showed that contraction energy increases up to a certain optimal length of the myocardial fibres and that the energy of contraction diminishes when the fibres are stretched beyond the critical length. Thus in congestive cardiac failure it might be that there has been excessive stretch of the muscle fibres.

In certain types of heart failure (anoxia, vitamin deficiencies, hormonal disturbances) a metabolic defect can be demonstrated, but in failure occurring in chronic hypertensive disease and valvular disease there appears to be no metabolic defect. In these conditions the basic defect would appear to be a failure to transform available metabolic energy into mechanical work.

The answers to many of the problems concerning the defect in heart failure are not yet available. Whether abnormal contractile proteins are formed, or failure occurs in excitation — contraction coupling, or partial or complete withdrawal occurs of the thin filaments from their relationship with the thicker filaments, or whether there is loss of essential electrolytes, is not established.[3] It is to be hoped that with the application of newer techniques more will become known about this intriguing and important problem.

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AMBULANS- EN ONGEVALLEDIENSTE

As gevolg van die algemene omstandighede waaronder ons leef, is daar weer orals in ons land, soos ook oor die res van die wêreld, 'n hernude belangstelling in die doeltreffende organisasie van ongevalledienste. Ons leef in 'n tyd waarin die bedreiging van ongelukke 'n baie belangrike faktor geword het by die beskouing van die publieke gesondheid en veiligheid. Van dag tot dag is ons blootgestel aan nywerheidsongelukke, aan pad- en straatongelukke, en aan ongelukke in die huis. En op die agtergrond van ons gedagtes is daar altyd die gevare wat daar skuil in natuurrampe en oorlogsontwrigting.

Hierdie belangstelling in die organisasie van ongevalledienste het belangrike fasette. Een faset van die probleem is die organisasie van ongevalleafdelings wat verbonde is aan opleidings- en algemene hospitale. Hierdie faset van die probleem is alreeds herhaaldelik in die *Tydskrif* bespreek,[1-3] toe ons onder meer gesê het dat as ons by die inrigting van ons mediese dienste die verbeelding sowel as die verstand wil gebruik, dit daartoe kan lei dat ons meer in staat sal wees om nie net noodsaaklike dienste te lewer nie, maar ook konstruktiewe, voorbehoedende dienste.

'n Ander aspek van die probleem van die hantering van ongevalle, veral in die geval van massa-ongevalle, is die vraagstuk van die inskakeling van hulpdienste uit die gemeenskap. Oor hierdie saak is daar verskil van mening.

Prof. Ian Aird[4] glo, byvoorbeeld, dat hulp in 'n nasionale natuurramp beperk behoort te word tot burgerlike persone wat verbonde is aan die Internasionale Rooikruisorganisasie, en geen ander hoegenaamd nie. Aan die ander kant is daar diegene wat meen dat wydverspreide fasiliteite soos, byvoorbeeld, van die weermag en van burgerlike organisasies, gebruik moet word. Dit sal goed wees as hierdie aspek van die probleem nog veel meer in besonderhede bespreek en uitgepluis kan word, sodat die elemente van 'n rasionele plan beskikbaar kan wees om op terug te val wanneer dit ook al mag nodig wees.

'n Derde belangrike aspek[5] van die probleem waaroor ons skryf, is die vraagstuk van die doeltreffende organisasie van ambulansdienste. Een manier waarop die saak benader kan word, is deur noue samewerking met ambulansstasies. Daar moet skakeling tussen die ambulansdienste en die hospitaal wees gedurende al die stadiums van elke besondere nooddiens. Byvoorbeeld, sodra die ambulans in kennis gestel word van 'n ongeluk, moet die hospitaal ook gewaarsku word. Deur middel van radiofone moet die ambulansamptenare gedurig met die hospitaal in verbinding bly. Sodra die ambulans by die plek van die ongeluk aankom, moet 'n skatting van die omvang van die ongeval en van die verwagte aansprake op die hospitaal gemaak word. Op hierdie manier kan alles in gereedheid gebring word by die hospitaal om volstoom te begin werk sodra die eerste ongevalle aankom, sodat die verloor van belangrike tyd by die behandeling van pasiënte wat aan ernstige skok lei, uitgeskakel kan word.

Die mening word ook gehuldig dat ambulansdienste direk onder die beheer van die hospitaal moet val, sodat die reëling en organisasie van ambulansdienste 'n integrale deel van die werk en verantwoordelikheid van die ongevalleafdeling vorm. As dit die geval is, sou dit byvoorbeeld maklik wees om mobiele eenhede te organiseer wat dit moontlik sou maak om geneeskundige en verplegingsdienste beskikbaar te stel — van die ongelukstoneel af tot in die hospitaal.

So 'n reëling sou dit ook makliker maak om die hele saak van vroeë, voorlopige behandeling van geskokte pasiënte op 'n wetenskaplike voet te plaas. Soos bekend, bestaan daar verskil van mening oor wat die aard en omvang van behandeling op die ongelukstoneel moet wees. Teen die agtergrond van 'n diens soos wat ons in die gedagte het, sou hierdie verskille mettertyd oorbrug en uitgewis kan word, sodat 'n metode kan ontstaan wat slegs die beste bied vir die ongelukkige pasiënte — of hulle nou ook al die slagoffers is van motor- of trein- of vliegtuigrampe, aardbewing, politieke of militêre opstote, of bomaanvalle.

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ALCOHOLISM AND LIVER-FUNCTION TESTS

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Bailie in 1793 and Addison in the early part of the 19th century recognized some association between alcoholism and cirrhosis of the liver.[1]

According to Jolliffe and Jellinek[2] cirrhosis is 6·8 times as frequent in alcoholics as in a non-drinking population; the incidence of cirrhosis is, however, low, even in severe alcoholics, and numerous alcoholics are found with completely normal livers. According to Zieve and Hill[3] there is no definite relationship between alcoholism and liver function in healthy, well-nourished and gainfully employed individuals. Relatively large amounts of alcohol may be consumed without evident abnormality of hepatic-function tests.

Where alcoholic excess leads to hospitalization, functional abnormalities are encountered, and varying numbers of these individuals, by continuing their excesses, eventually develop fatty livers and portal cirrhosis. Spree drinkers are less likely to develop liver damage than continual topers. This is probably explained by the fact that spree drinkers eat reasonably well in the intervening periods. Sherlock[1] suggests that there may exist an inherent individual susceptibility to alcohol. The type of beverage consumed does not appear to influence the liability to develop cirrhosis. The exact relationship between alcohol and cirrhosis remains conjectural and there are probably several contributing factors.

Relationship between Alcohol and Cirrhosis

Alcoholic cirrhosis is probably caused by a combination of nutritional factors and, in some instances, by a direct toxic effect on the liver.

Added caloric intake in the form of alcohol leads to increased choline requirements which may not be met. Cirrhosis in animals is more readily produced by an increased caloric intake in the presence of a fixed amount of lipotropic substances. Evidence exists that in alcoholic cirrhosis a relative choline deficiency exists, and a state of nutritional imbalance ensues.

The anorexia, associated gastritis, and other gastrointestinal disturbances so often found in the alcoholic, lead to decreased absorption of protein and vitamin B. In addition, the alcoholic, after spending much of his earnings on drink, has very little left to purchase protein-rich foods. This results in a deficiency of protein intake, and evidence exists that in the presence of a low protein intake liver disease is more common. This factor can therefore be referred to as a state of 'nutritional deficiency'.

The third factor, a direct toxic effect on the liver, may result from toxins being more easily absorbed from the damaged intestinal mucosa. Certain alcoholic beverages may contain toxic substances which may possibly exert a direct effect on the liver, or alcohol may aggravate defined and undefined hepatotoxic substances.

Alcoholism

'Alcoholism' can be defined as a state of periodic or chronic intoxication, detrimental to the individual and society, and produced by the repeated ingestion of alcoholic beverages. Its characteristics are: (1) Compulsion to continue taking alcohol, (2) early development of tolerance to alcohol,

(3) psychic dependance on the effects of alcohol, and (4) somatic dependance on alcohol, resulting in withdrawal symptoms when abruptly withheld.

The development of means to continue drinking becomes an important motive in the alcoholic's existence. Once the mechanism of true addiction has been established, the only way in which the patient can maintain some degree of functional efficiency is to continue drinking.

The withdrawal symptoms most commonly encountered are: (1) Restlessness, (2) severe feelings of apprehension, (3) depression, (4) irritability, (5) lack of concentration, (6) insomnia (often intolerable), (7) nightmares, (8) tremor of tongue and extremities, (9) *grand mal* seizures, (10) nausea and vomiting, (11) diarrhoea, and (12) increased pulse rate.

Clinical study of the problem of alcoholism over the past 10 years has led one of us to hold strongly the hypothesis of an inborn tendency to the development of addiction. One in 1·78 of the patients admitted to Northlea and Mount Collins sanatoria gives a family history of alcoholism. Almost universal is the history of a rapidly developed tolerance to alcohol resulting in a reputation for being able to 'take one's liquor without getting drunk'. Hangover is practically unknown before the development of compulsive drinking. The tremendous release from tension, even after comparatively small amounts of alcohol (noted by many), is a feature reported by nearly all patients before alcohol became a problem.

In view of the association between alcoholism and liver disease, it was decided to carry out a battery of so-called liver-function tests on an unselected group of 40 volunteer male patients admitted for treatment for alcohol addiction to Northlea Retreat, Johannesburg.

MATERIAL AND METHODS

Initial tests on the group investigated were carried out within 48 hours of admission and the tests were repeated (when possible) at monthly intervals. The group was a true random group, completely unselected beside the fact that all required admission to hospital suffering from the acute effects of a recent bout of drinking.

Characteristics of the Group

1. The average age of the members of the group was 38·1 years, individuals ranging from 25 to 45 years of age.
2. The average length of time lapse between the first drink and the advent of daily drinking was 9·6 years, with a range of from 2 to 18 years.
3. The average lapse of time between commencing daily drinking and admission was 12·9 years with a range of from 5 to 18 years.
4. All the patients in the group were admitted showing signs of dehydration to some degree.
5. 71·6% of the group volunteered that early in the drinking history their capacity to take alcohol was greater than that of their drinking friends.
6. 77·6% of the group stated that they became intoxicated and incapable on comparatively little alcohol since the beginning of compulsive drinking.
7. 21% of the group showed evidence of alcoholic peripheral neuritis.
8. 82% showed some hepatic enlargement ranging from 'palpable' to 5 fingers below the costal margin.
9. Only 2% of the group took regular meals during drinking bouts and the same percentage took breakfast regularly.
10. 98% of the group admitted to alcoholic palimpsests at some stage or other of their drinking history.
11. Only one patient manifested any degree of clinically apparent icterus.
12. All the patients fell into our definition of the alcoholic, viz.

(*a*) Once having had a certain amount of alcohol, a compulsion to consume more alcohol developed.
(*b*) Withdrawal signs appeared on the withholding of alcohol.
(*c*) Some aspect of their lives (physical, general environmental, domestic, or economic), was seriously affected by their drinking.

The laboratory tests carried out on all patients in this investigation were as follows: Thymol turbidity, thymol flocculation, colloidal red flocculation, cephalin cholesterol flocculation, Takata-Ara reaction, zinc sulphate turbidity, total lipids, blood cholesterol (total, free, and esterified), serum proteins, electrophoretic protein analysis, alkaline phosphatase, pseudo-cholinesterase, bilirubin (total and direct), Van den Bergh reaction, bromsulphalein dye retention, mucoprotein, polysaccharides of mucoprotein, ratio of polysaccharides to mucoprotein (PM ratio), packed-cell volume, sedimentation rate, prothrombin index, and urinary urobilin.

The techniques and normal values adopted for the above tests were as previously described.[4,5]

The protein electrophoretic analyses were carried out on the Antweiler electrophoretic apparatus: Mucoprotein and polysaccharides of mucoprotein were carried out according to the method of Simpkin *et al.* and Shetlar *et al.* respectively.[6,7] The sedimentation rate and packed-cell volume were carried out according to the method of Wintrobe and Landsberg.[8] Prothrombin index was estimated by the two-stage technique of Quick.

RESULTS

Table I shows the percentage of abnormal tests found on admission of our patients to the sanatorium. Since the majority of these patients were discharged within a month of admission, no attempt is made to compare the results on admission with those subsequently carried out.

TABLE I. PERCENTAGE OF ABNORMAL LIVER-FUNCTION TESTS IN THE GROUP OF ALCOHOLICS ON ADMISSION

Test	%
Thymol turbidity	5·0
Thymol flocculation	12·5
Colloidal red	17·5
Cephalin cholesterol	12·5
Takata Ara	5·0
Zinc sulphate turbidity	32·5
Total lipids	15·0
Total cholesterol	11·0
Percentage esterified to total cholesterol	0
Total protein	62·0
Albumin	24·0
Globulin	3·0
Gamma globulin	11·0
Albumin, globulin ratio	16·5
Alkaline phosphatase	7·5
Pseudo cholinesterase	12·5
Bilirubin, total	5·0
Bilirubin, direct	15·0
Van den Berg reaction	20·0
Bromsulphalein dye retention	9·0
Mucoprotein	65·0
Packed-cell volume	36·0
Sedimentation rate	43·5
Prothrombin index	9·0
Urobilin	73·5

The following are summaries of and comments on the results of the tests:

Thymol Turbidity, Flocculation Tests, and Takata-Ara Reaction

Only a small percentage of our patients showed ab-

normalities of these tests. The colloidal-red test was the most sensitive in this group and the thymol turbidity and Takata-Ara reaction, the least sensitive. Only one patient showed a maximally positive result for the Takata-Ara reaction, and the mean average level for the thymol turbidity test (2·2 units) was well within the range of normality.

Approximately a third of our patients showed a raised zinc sulphate turbidity test and in 3 there was definite elevation of this test—32, 25, and 22 units respectively. The mean level for this test was just slightly above the upper limits of normal (13·3 units).

Total Lipids

Two patients showed marked elevation, 2 showed only slightly raised levels, and one showed a moderate increase. The mean level on admission was well within the range of normality (567 mg. per 100 ml.).

Total Cholesterol

Four patients showed elevated cholesterol levels and 2 of these showed levels above 300 mg. per 100 ml. Four out of 37 patients showed levels which are on the low side of normality. The mean average figure was well within the range of normality (218 mg. per 100 ml.).

Percentage of Esterified to Total Cholesterol

Not a single patient showed any disturbance of the ratio of the esterified to total cholesterol.

Total Protein

A very high percentage of our patients (62%) showed levels of total protein which were on the low side of normality. This test was the third most sensitive in our series. The mean level of protein on admission was 6·6 G. per 100 ml. against a normal mean of 7·6 G. per 100 ml., but only slightly below our accepted lowest limits of normality (6·8 G. per 100 ml.). Three of our patients showed levels below 6·0 G. per 100 ml.

Albumin

The average level for serum albumin (3·6 G. per 100 ml.) was well below our normal mean of 4·5 G. per 100 ml. Nine patients (24%) showed levels below 3·5 G. per 100 ml., our accepted lowest limit of normality.

Globulin

The mean level for serum globulin was well within normal limits, and only one patient showed a definite elevation of serum globulin.

Gamma-globulin Turbidity

Four patients showed elevation of this test and in the case of 2 patients there was a definite elevation, (2·0 and 2·7 G. per 100 ml. respectively). The mean average level was well within the range of normality (1·07 G. per 100 ml.).

Albumin-globulin Ratio

Despite the high percentage of patients who showed a low total protein and serum albumin, only 6 patients (16·6%) showed a reversal of the albumin-globulin ratio on admission.

These protein results therefore probably reflect a low intake of protein rather than evidence of liver dysfunction.

Protein Electrophoretic Analysis

The significant feature of the electrophoretic protein pattern was a reduction in the percentage of albumin (48% as against a mean level of 55%), and an increase in the alpha$_1$ globulin (9·2% as against 6·5%). The gamma-globulin level shows only a minimal increase over our mean level of normality, and is well within the normal range.

Alkaline Phosphatase

Three patients showed only slightly elevated alkaline-phosphatase levels. The mean level on admission was well within the range of normality (8·3 units).

Pseudo Cholinesterase

Only 2 patients showed levels which were well below the normal range, and 3 patients showed levels just below the accepted normal levels. The mean average level was 92% of normal activity.

Bilirubin

Direct. Six patients showed levels above 0·2 mg. per 100 ml. and one of these showed a level of 2·5 mg. per 100 ml. The mean level was 0·27 mg. per 100 ml.

Total. Only one patient showed a definite hyperbilirubinaemia (3·7 m.g per 100 ml.) and one other patient showed a level of 1·4 mg. per 100 ml. The mean bilirubin level on admission was 0·39 mg. per 100 ml.

Van den Bergh Reaction

Only one patient showed a prompt direct reaction and 7 other patients showed an indirect reacting bilirubin.

Bromsulphalein Dye Test

Two out of 22 patients studied on admission showed a dye retention above 5% (dose: 5 mg. per kg. body weight after 45 minutes)—7% and 8% respectively. The mean dye retention was 3·17%, a figure well within the accepted range of normality.

Mucoprotein Level

This test showed the second highest percentage of abnormalities in our series; 65% showed definitely elevated levels and only 4 patients showed levels corresponding to our mean of 80 mg. per 100 ml. The mean level on admission was 130 mg. per 100 ml. Not a single person had a low level. In a further paper now in preparation by us, an interesting, but as yet unexplained, phenomenon was observed. Mucoprotein estimations were carried out on admission of chronic alcoholics in relapse. High figures were invariably obtained. On withdrawing alcohol an immediate further increase to levels in the vicinity of 200 - 300 mg. per 100 ml. were recorded. Then followed a gradual return to normal levels but, on the administration of even relatively small amounts of alcohol, an immediate rise to high mucoprotein levels was again observed. It is suggested (by us) that a diagnosis of alcoholism may be made in those patients who are not suffering from malignant disease or inflammatory conditions, but show abnormal liver-function tests with a high serum-mucoprotein level.

Polysaccharides to Mucoprotein Level (PM Ratio)

Only one patient had an abnormal result of 0·23 which is indicative of parenchymal liver damage.

Urinary Urobilin

Of our cases 74% showed on admission the presence of urobilin in the urine. This was the most frequently abnormal test encountered in our series.

Packed-cell Volume

Thirteen out of 36 patients (36%) showed some evidence of anaemia and one patient was polycythaemic. The mean packed-cell volume was 45·8%. Five of the 13 patients with anaemia showed packed-cell volumes below 40%, and the polycythaemic patient had a packed-cell volume of 55%.

Sedimentation Rate

The mean sedimentation rate was 15 mm. in 1 hour. Twenty-two of 39 patients investigated had rates within normal limits. In 2 patients extremely high sedimentation rates of over 50 mm. per hour were encountered.

DISCUSSION

Voegtlin *et al.*[9] investigated a large group of chronic alcoholics, all from the middle and upper classes of society, whose state of general health was surprisingly good. Of them 9·6% were entirely free from laboratory evidence of liver dysfunction, 16·3% showed minor abnormalities of one test only, 53·3% showed minor abnormalities in 2 or more tests, 17·3% showed minor abnormalities of 1 or more tests, but with 1 test markedly abnormal, 2% had evidence of severe liver dysfunction, and 1·3% had severe liver damage with obvious jaundice. They found the most sensitive liver-function test to be the bromsulphalein test, and the next most sensitive the total serum bilirubin. However, since 20% of their normal controls showed abnormalities of these latter tests, they question whether in their series those patients who showed equivocal abnormalities (i.e. one test only abnormal), might not be false positive reactions.

In addition, abnormalities in urinary urobilinogen excretion and alkaline phosphatase were frequently encountered. Abnormal results for cholesterol, free and esterified, one-minute bilirubin, albumin-globulin ratio, and flocculation tests were rarely encountered. The prothrombin index, in their opinion, was an unreliable index of liver function in the chronic alcoholic.

Cates[10] studied liver-function tests in proved alcoholic cirrhotics and found that the most frequently abnormal tests in this group were the bromsulphalein test, the proteins, and the albumin-globulin ratio, whereas in a group of 17 acute alcoholics (non-cirrhotics), serum albumin and globulin were within normal limits, only 4 patients showed evidence of bromsulphalein-dye retention and only one showed disturbances in esterified cholesterol. Cates suggests that early and perhaps temporary impairment of liver-function tests may be detected by the bromsulphalein dye-retention test.

Popper and Schaffner,[11] in reviewing over 200 cases of fatty livers in the medical literature, found the most frequent abnormal test to be bromsulphalein dye retention in 70% of cases. In 35% the cephalin cholesterol flocculation test and alkaline phosphatase were increased. The gamma globulin was slightly elevated whilst bilirubinaemia and reversal of the albumin-globulin ratio were present in 25% of patients. The thymol-turbidity test was increased in only 20%. Reduced cholesterol esters or prolonged prothrombin times were found only exceptionally, and the serum-cholesterol level tended to be low.

In nutritional cirrhosis they found the bromsulphalein test usually abnormal, and albumin, cholinesterase, and total cholesterol were reduced in the majority of cases. The gamma globulin was increased in more than 50% of cases. When hepatocellular damage was severe, the percentage of esterified cholesterol was low, urobilinogen was increased, and the cephalin cholesterol—but not necessarily the thymol-turbidity test—was increased.

Cates[12] states that liver damage, as revealed by the bromsulphalein-dye retention test, may occur from alcohol and may disappear if the damage is not too severe.

The bromsulphalein-dye test is sensitive enough to pick up various degrees of liver damage, either with physiological dysfunction alone or associated with pathological changes.

Beazell *et al.*[13] investigated 10 healthy young adult males who consumed 'as much as possible' whisky over a 4-hour period and who became maximally intoxicated. Ten hours later the serum van den Bergh reaction, and tests for phosphatase, hippuric-acid excretion, bromsulphalein clearance, urine bilirubin galactase, and fructose-tolerance were carried out. In no case was there any evidence of a variation from the normal in these tests.

Buck[14] studied 7 male alcoholics with fatty livers. He states that incipient cirrhosis in alcoholics is characterized by fatty infiltration and enlargement of the liver. He found that it is in such cases that spontaneous remissions occur when alcohol is withdrawn and a satisfactory dietary régime established.

The cephalin-cholesterol test was positive in 3, the thymol-turbidity test in 2, a moderate to marked hypoalbuminaemia was present in 5, abnormal bromsulphalein retention in 7, and a mild macrocytic anaemia in 4.

Lepehne[15] found a positive cephalin-cholesterol test in 38% of alcoholic patients, 30% showed positive urobilinogen tests and 21% showed bilirubinuria (using the methylene-blue test), though none of the patients were clinically jaundiced.

Nadeau *et al.*[16] state that, of the numerous liver-function tests available to the clinician, the bromsulphalein test has proved to be the most reliable index in the screening of the slightest dysfunction (usually unnoticed by clinical examination). More than half of 178 alcoholic patients showed an abnormal dye retention using the standard 5 mg. per kg. method.

Phillips and Davidson[17] investigated 18 chronic alcoholics who died, and found that 16 showed pronounced bilirubinaemia, and only 1 patient had a normal icteric index. There was a pronounced decrease in prothrombin concentration. The cephalin-cholesterol test was usually markedly positive, and the alkaline-phosphatase test was normal.

It appears quite evident from the literature cited above and from the pattern of abnormal liver-function tests obtained in our series of cases that liver-function abnormalities are often encountered in chronic alcoholics. In our series, the most frequently observed abnormal tests were the presence of excessive urobilin, a high initial mucoprotein level and low total-serum protein. However, the 'true' tests of liver function, viz. the bromsulphalein-dye retention test, cholinesterase, reversal of albumin-globulin ratio, a reduction in the percentage of esterified cholesterol, and bilirubinaemia were only disturbed in a small percentage of our cases. Elevated gamma-globulin levels are very characteristic of cirrhosis of the liver, and yet in our series only a very small percentage of patients showed abnormal values, using both a chemical turbidity method and electrophoresis.

The most sensitive liver-function test, the bromsulphalein-

dye retention test, was only slightly abnormal in 9% of cases. Mucoprotein levels are usually reduced in portal cirrhosis[18] and in our series the reverse was found. Of our patients 65% showed markedly elevated levels, and not in a single case was a low level encountered.

Only one of our cases had the typical biochemical profile of cirrhosis of the liver—with a fatal outcome in this patient. In the large series of Voegtlin *et al.*[9] only 2 patients out of 300 had biochemical characteristics of portal cirrhosis.

Our results seem to suggest that a characteristic type of liver dysfunction is present in chronic alcoholics that is probably a pathological entity other than portal cirrhosis. These observations bear out what we have previously published,[19] namely, that apparently only those patients whose livers are predisposed by other factors respond to the chemotoxic action of alcohol by the development of cirrhosis of the liver.

Our results seem to conform with the views of Voegtlin *et al.*[9] and with Lepehne[15] who states that liver dysfunction in alcoholic patients can be largely transient, that even serious damage as found by liver biopsy can subside in a month, that the occurrence of cirrhosis is surprisingly rare, and that this develops only if several different factors are present.

Spellberg[20] sums up the position when he says that the statement that liver injury is significantly more frequent amongst chronic alcoholics is undoubtedly true, but whether alcohol as such or whether nutritional factors are the underlying cause is another question. Evidence suggests that diet is probably the more important factor, since:

1. Chronic alcoholics of many years standing may show normal livers, both from a functional point of view and anatomically.

2. Total abstainers, especially in countries where malnutrition is common, suffer from chronic liver disease.

3. In animal experiments continuous large doses of alcohol produce a mild fatty liver which may be prevented by an adequate protein diet.

Alcohol may contribute to the development of a fatty liver, either primarily or secondarily by interfering with the utilization and/or absorption of some of the food substances ingested. The large, soft, fatty liver is a common finding in the early alcoholic. Doubt still exists, though, as to whether the fatty liver is a precursor of human cirrhosis.

Liver dysfunction in our series, as revealed by liver-function tests, suggests that the impaired function in chronic alcoholics is not caused by cirrhosis, but is secondary to fatty deposition in the liver, and is temporary and reversible by abstinence, rest, and an adequate protein and vitamin intake.

SUMMARY

1. A battery of liver-function tests was carried out on 40 volunteer male alcoholic addicts.

2. The most frequently abnormal tests were increased urobilin, raised mucoprotein levels, and a low total protein. Abnormal bromsulphalein-dye retention, reversal of albumin-globulin ratio, and elevated gamma-globulin levels were rarely encountered. Only 1 patient was clinically jaundiced and not a single patient showed a low percentage of esterified cholesterol to total cholesterol.

3. On withdrawal of alcohol a further rise in the mucoprotein was observed; this was followed by a gradual return to normal levels. On subsequent administration of alcohol, even in relatively small amounts, an immediate rise of the mucoprotein level was again observed.

4. Our results suggest that a characteristic type of liver dysfunction is present in chronic alcoholics which is distinct from that found in portal cirrhosis.

We wish to thank the Director and Deputy Director of the South African Institute for Medical Research for their interest in this study, the staff of the Liver Function Unit of the Institute, the staff of Northlea, and the volunteers who made this study possible.

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DIVERTICULAR DISEASE OF THE COLON

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PART I

It is generally held that diverticula of the colon are usually asymptomatic. Evidence for this is the frequency with which they are found incidentally during barium-enema examinations and at autopsy. Symptoms are usually produced when the diverticula become inflamed, and the orthodox view is that the surgery of diverticula is the surgery of the complications supervening on inflammation of these pouches. However, two very serious complications of diverticula of the colon, namely, massive haemorrhage and free perforation, may occur in association with no, or at the most minimal' inflammation. The review of 90 cases from the Johannesburg General Hospital presented here is thus concerned with those in which the clinical features were attributed to the diverticula, whether there was evidence of diverticulitis or not. The patients were all admitted to hospital and the series is a selected one in this sense only. Numerous patients in whom diverticula were discovered as an incidental finding, or who were not admitted to hospital, were not included in the survey.

The cases have been divided into 6 groups, according to their predominant clinical presentation. The groups are discussed under the headings of: (1) haemorrhage, (2) spreading peritonitis, (3) abdominal or pelvic mass, (4) fistula formation, (5) intestinal obstruction, and (6) 'uncomplicated' diverticulitis. With regard to the 'uncomplicated' group, it soon became apparent that the diagnosis of diverticulitis is far from easy, and that many cases were coded as such largely on the basis of radiological evidence. A critical analysis of this evidence shows that it bristles with difficulties and controversy. It is evident that the accuracy of such a diagnosis is of great clinical importance in assessing the natural history of diverticulosis and in formulating policies of management.

I do not intend to review the history of this condition. There are many excellent reviews of this aspect in the literature, and the reader is referred to the paper of Todd[3] as an example.

Incidence

It is difficult to establish the exact incidence of diverticulosis, and more especially the frequency with which diverticulitis complicates it. An often quoted statement is that 5 - 10% of people over the age of 40 have diverticulosis of the colon, that 20% of these will develop diverticulitis, and that 20% of those with diverticulitis, i.e. 4% of patients with diverticulosis, will require some form of surgery.[2,3] Boyden's[13] estimate is a half of the above figures. In a valuable review of 503 patients with diverticulosis seen in office practice, and followed for periods of up to 18 years, Horner[10] found that 85, or 16%, developed evidence of diverticulitis, and that only 2 of these, i.e. 0·4% of all his cases of diverticulosis, required surgery. His thesis is therefore the benign character of the natural history of this condition.

The incidence of diverticulosis among the general population can be calculated either from barium-enema studies or from autopsy material. Morton[4] found diverticulosis in 6·5% of 8,500 autopsies, and Ochsner and Bargen[5] reported diverticula in 7% of a series of autopsies at the Mayo Clinic. Pemberton *et al.*[6] found diverticulosis in 8·5% of 47,000 barium enemata at the Mayo Clinic. A similar figure (8%) was found by Grout[7] in 2,179 consecutive barium enemata.

Age incidence. The greatest incidence undoubtedly occurs in the later decades. Of Smithwick's[8] cases, 87% occurred in the 5th, 6th and 7th decades, while 95% of Bacon's[9] patients were over 40. In 2,000 consecutive barium enemata at the Massachusetts General Hospital, Welch *et al.*[2] found no cases under the age of 35. After 35 there was a steady increase with age, until two-thirds of all barium enemata at the age of 85 showed diverticula. The importance of this very high incidence in the aged patient becomes apparent when the aetiology and management of the group with massive rectal haemorrhage is considered.

Lloyd-Davies[1] and other authors drew attention to the great difficulty in accurately estimating the incidence of diverticulitis supervening on diverticulosis. We shall consider this problem in greater detail at a later stage.

Sex incidence. There are conflicting reports on the sex incidence in the literature. Edwards[10] and Lockhart-Mummery[11] found no sex difference in diverticulosis, whereas diverticulitis showed a male preponderance. Ford[12] and Welch *et al.*,[2] on the other hand, found the incidence of diverticulitis in females to equal or exceed that in males. Boyden[13] found no sex difference.

There is a steady increase in deaths from diverticulitis. This is considered to be a manifestation both of the increasing age of the population,[14] and of better diagnosis.[1]

Anatomy and Pathogenesis

It is now generally accepted that diverticula of the large bowel, with the possible exception of those in the caecum, are acquired in origin. In a classical paper in 1916, Drummond[15] drew attention to the pattern of the vascular supply of the colon (Fig. 1). In the transverse and sigmoid colons, the vessels do not pierce the muscular coat of the bowel immediately on reaching it, but run circumferentially in the subserosa until the margin of the corresponding taenia is reached. At this point they dip inwards through the circular layer and then ramify in the submucosa. These penetrations form 'loci minoris resistentiae' through which pouches of mucous membrane herniate, and the diverticula are thus formed in 2 parallel rows situated between the mesenteric and the 2 antimesenteric taeniae. Once formed, the diverticula enlarge in the direction of least resistance, namely, into the appendices epiploicae or into the leaves of the mesentery. The appendices epiploicae are thus of no aetiological significance in the genesis of diverticula. Lloyd-Davies[1] records only one case in which the area between the antimesenteric taeniae was involved. According to Drummond then, the blood vessels of the normal colon predispose to sacculi to the same extent that the spermatic cord predisposes to inguinal herniation.

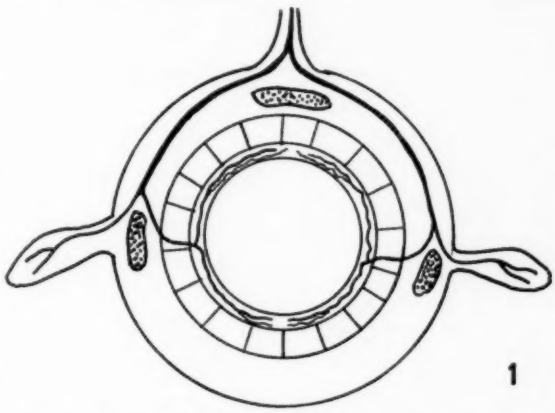

Fig. 1. Diagram of the pattern of blood supply to the colon (after Drummond).

Granted the existence of potential weaknesses in the wall of the colon in all people, there must be some precipitating factor or factors to determine the appearance of actual mucosal herniations in some individuals only. In conformity with the development of herniae elsewhere in the body, this may be a factor in the wall converting a potential weakness into an actual one, or a factor producing a pathological increase in intraluminal tension.

That factors in the wall are important, is supported by the undoubted fact that the incidence rises with increasing age. Not all aged people develop diverticulosis, however, and some

patients affected are relatively young. Is there a basic connective-tissue defect, either congenital or acquired, in these patients? The association of hiatus hernia and diverticulosis is well known. Horner[19] found an incidence of 16·3% of hiatus hernia in 292 of his series submitted to barium-meal examination. It would be instructive to assess the incidence of direct inguinal hernia or weakness in patients with diverticulosis, but I am unaware of any such correlation having been attempted. Weakening of the wall of the bowel as a result of obesity has been implicated, because of a common clinical impression that patients with diverticulosis are usually obese. The present series, and several others in the literature[15,19] fail to confirm obesity as an aetiological factor in these patients. Stretching of the vascular apertures owing to chronic venous congestion has also been postulated as a causal factor. However, Drummond[15] found no cases of diverticulosis in a postmortem series of patients dying from chronic venous congestion.

Of factors producing a pathological increase in intraluminal tension, constipation is usually cited as being important. In the present series only about one-third of the patients complained of constipation, but an exact analysis is purposely not attempted, since 'constipation' is a notoriously elastic symptom, and a retrospective analysis from case notes would only magnify the error. However, Horner,[19] in his personal and prolonged follow-up, found constipation to be present in only 14% of his patients. Edwards[10] felt that incoordinated action of the bowel muscle is important because the vascular outlets become smaller during contraction and larger during relaxation of the gut wall, so that incoordinated action producing contraction of 2 segments with relaxation between them would bring about circumstances conducive to formation of mucosal herniation. Of significance in this respect is the finding[19] that 83% of 42 patients who were X-rayed several years before the appearance of diverticula were diagnosed as having the spastic-colon syndrome.

The racial difference in Johannesburg is also very significant. I reviewed all the barium enemata performed at the Coronation Hospital over a two-year period and was unable to find a single case of diverticulosis of the colon in an African. This is in accordance with the clinical experience that diverticulitis is an extreme rarity in the African. The cause of this is obscure, but it may be significant that the spastic-colon syndrome is very seldom such a source of therapeutic despair in the African patient as it is in the European. It has also been claimed, probably with tongue in cheek, but possibly with an element of truth, that diverticulosis is a social disease, being prevalent in communities which inhibit the passage of flatus.

It must be noted that not all authors accept the blood-vessel theory of the aetiology of diverticulosis. Fausler[16] stated that the areas of weakness are caused by degenerative changes in the muscle, while Henderson[17] felt that inflammatory episodes cause weakening of the wall and *precede* the appearance of diverticula.

HAEMORRHAGE

Bleeding per rectum is a relatively common accompaniment of diverticulosis and diverticulitis of the colon. The exact frequency with which diverticular disease of the colon is directly responsible for the bleeding is subject to much difference of opinion. In 1939 Rankin and Graham[18] stated that diverticula have little significance from the diagnostic point of view, and that further investigation and the passage of time will usually reveal the real cause. On the other hand, authors like Welch,[2] Smithwick,[8] Boyden,[13] Bacon and Sherman,[9] and Stone,[47,48] stated that bleeding is an important symptom, the incidence given ranging from 11·6%[13] to 80%.[9]

The bleeding is of 2 main types. On the one hand there is the massive exsanguinating haemorrhage, which is almost invariably associated with uncomplicated diverticulosis. A variant of this form is the patient who presents with a severe hypochromic anaemia without any obvious bleeding episode. This also appears to be a complication of diverticulosis rather than diverticulitis. On the other hand, mild bleeding tends to occur in association with diverticulitis, although uncomplicated diverticula do not necessarily bleed massively. Analysis of the present series confirms these 2 tendencies. The incidence of occult blood in the stools could not be determined in this series, since the investigation was not performed sufficiently often to draw any conclusions. The patients to be discussed therefore all had macroscopic bleeding.

Of the 90 patients in this series, 27 complained of passing blood per rectum. In view of the great frequency with which diverticula are an incidental finding, all patients with other lesions which may reasonably have been the cause of the bleeding, have to be excluded, and 5 of the 27 were so excluded. Two patients had hiatus hernia, 1 patient had a duodenal diverticulum as well, and 2 patients had obviously bleeding haemorrhoids. There are thus 22 patients left who had no other detectable source for the bleeding, an incidence of 25%. It is felt that this figure is too high because the cases were selected, all being hospitalized, and in such selected cases bleeding is obviously an important symptom. Bacon[9] claimed that it ranks equal in incidence with perforation, fistula formation and intestinal obstruction, and Welch *et al.*[1] used it as an indication for resection in 5% of their cases submitted to surgery. The overall incidence in this series was 27%.

Massive Haemorrhage

Fraenkel[20] quoted Corry in Oxford as teaching that when an elderly or middle-aged person, apparently in fair health, has a sudden, unexpected and alarmingly profuse recta

TABLE I. MASSIVE HAEMORRHAGE

Age	*Sex*	*Clinical diagnosis*	*Barium enema*	*Barium meal*	*Treatment*	*Result*
75	F	Diverticulosis	Diverticulosis	Normal	Conservative	Bleeding stopped
81	F	Diverticulosis	Diverticulosis	Normal	Conservative	Bleeding stopped
72	F	Diverticulosis	Diverticulosis	Normal	Conservative	Bleeding stopped
70	F	Diverticulosis	Diverticulosis	Normal	Conservative	Bleeding stopped
84	M	Diverticulosis	Diverticulosis	Normal	Conservative	Bleeding stopped
68	M	Diverticulitis	Diverticulitis, ? carcinoma	Normal	Resection	Bleeding stopped
83	F	Diverticulosis	Diverticulosis	Normal	Conservative	Bleeding stopped

haemorrhage of perhaps several pints, full investigation is likely to reveal diverticulosis of the colon only, and bleeding is unlikely to continue. A week or more later the stools will be clear of occult blood, which differs from what is found in carcinoma of the colon. Hoar and Bernhard[21] stated that carcinoma of the colon is undoubtedly the commonest cause of colonic bleeding, overt or occult. However, cancer of the colon is a relatively uncommon cause of massive exsanguinating rectal haemorrhage.

Of the 90 patients in this series, 7 (8%) presented with massive rectal haemorrhage (Table I). The advanced age of the group is immediately apparent, the range being 68 - 84 years, with an average of 79 years. There is a marked female preponderance in this group. In 6 of the 7 patients, the clinical and radiological picture was that of diverticulosis uncomplicated by any diverticulitis. The barium enema invariably showed extensive and massive diverticulosis (Fig. 2), an important feature when the surgical implications are considered. In 1 case only was the clinical and radiological

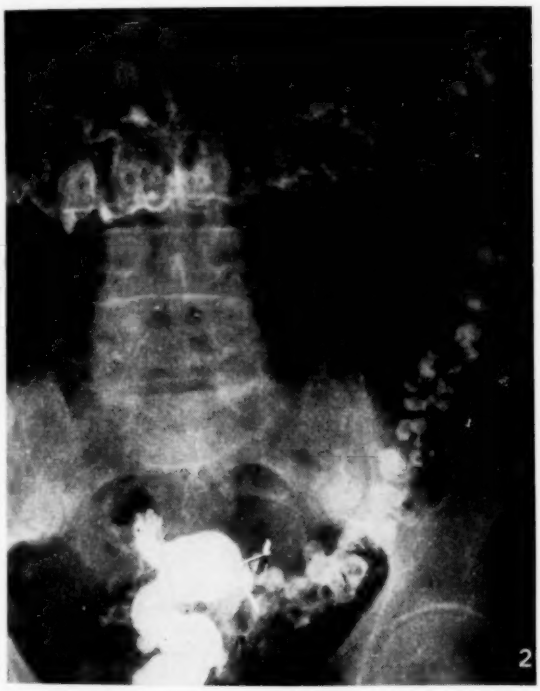

Fig. 2. Extensive, diffuse diverticulosis in a patient with massive rectal harmorrhage.

picture that of diverticulitis. This was also, incidentally, the youngest patient in the group (68 years) and he presented with a mass in the left iliac fossa. A barium enema showed a filling defect which could not be distinguished from a carcinoma, and he accordingly underwent resection. In all the other patients the treatment was conservative. All required vigorous resuscitative measures in the form of blood transfusions, which were massive on occasion. All the patients recovered on this management and there was no further bleeding while they were in hospital. In all cases barium-meal examinations revealed no other cause for the haemorrhage.

This experience is in accordance with that reported in the literature. The vast majority of authors recommend a conservative approach. Hoar and Bernhard[21] are practically alone in their advocacy of a more aggressive attitude. They feel that the majority of these patients are very old and this age group withstands repeated major haemorrhages very poorly.

If the surgeon is forced to operate because of failure of conservative measures, and this does happen rarely, he is likely to be faced with a dilemma after the abdomen has been opened. A localized area of diverticulosis, and the absence of any other aetiological lesion, lends itself readily to surgery, but, as has been shown, the lesion is usually diffuse, and it is difficult or impossible to locate the bleeding site. The mucosal erosions may be too small to recognize even by inspection of the opened specimen at operation or autopsy.

To cope with this problem several procedures have been advocated, ranging from simple closure of the abdomen to sub-total colectomy.[49] Intermediate procedures are blind resection of the most involved portion of the colon, usually the sigmoid, or the performance of one or more localizing colostomies and subsequent resection of the half of the colon which is involved.[50] Kunath[51] has mentioned the instillation of topical coagulants (a mixture of powdered 'gelfoam', topical thrombin and neomycin) through a caecostomy. The isolation of serial segments of the colon, each 'milked' empty of blood, by means of non-crushing clamps, observing which segment refills with blood, and dealing with it, is a recent and ingenious suggestion.

It is evident from the reports quoted above that surgery for massive colonic haemorrhage from diverticulosis is beset with difficulties and dangers. This, coupled with the experience, which our own supports, that the vast majority settle on conservative measures, should make the surgeon extremely hesitant to operate on these patients. It goes without saying that gastro-duodenal bleeding, a not too uncommon cause of massive rectal haemorrhage, must be excluded, but I feel that the correct attitude is an even more conservative one than that of Kunath,[51] who suggested a therapeutic policy similar to that for upper gastro-intestinal bleeding. The pathology is different in the 2 groups. The cause of massive bleeding in diverticulosis can be deduced from a consideration of the anatomy and pathogenesis of the pouches. It is evident from Fig. 1 that a moderately sized artery is separated from the lumen of the colon merely by the mucosa of the neck of the diverticulum, so that pressure from an impacted faecolith can conceivably cause erosion of this vessel with ensuing brisk haemorrhage. Inflammation is minimal and we do not have to contend with the presence of digestive juices in the colon, as is the case in the stomach or duodenum. Cessation of bleeding can thus reasonably be anticipated. The rarity of severe bleeding in established diverticulitis can be explained by the protective cushion of oedema and inflammatory tissue between the vessel mentioned and the lumen of the gut.

It is fully realized that the indictment of diverticulosis as the cause of the bleeding in this group is open to criticism. Two-thirds of people over the age of 85 have diverticulosis, and patients in this group are almost invariably aged. Many surgeons can quote cases where prolonged follow-up has brought to light another lesion, such as an angioma, which was probably the cause of the bleeding after all, and it is evident that this diagnosis can only be made by a process

TABLE II. MILD BLEEDING

Age	*Sex*	*Clinical diagnosis*	*Barium enema*	*Treatment*	*Result*
74	F	Diverticulitis	Diverticulitis	Conservative	Recovered
57	F	Diverticulosis	Diverticulitis	Conservative	Recovered
68	F	Diverticulitis	Diverticulitis	Conservative	Recovered
62	F	Diverticulitis	Diverticulitis	Surgical	Recovered
87	M	Diverticulitis	Diverticulitis	Conservative	Recovered
65	F	Diverticulosis	Diverticulitis	Conservative	Recovered
73	F	Diverticulitis	Diverticulitis	Conservative	Recovered
72	F	Diverticulitis	Diverticulitis	Surgical	Recovered
55	M	Diverticulitis	Diverticulitis	Surgical	Recovered
62	F	Diverticulitis	Diverticulitis	Conservative	Recovered
61	F	Diverticulitis	Diverticulitis	Conservative	Recovered
51	F	Diverticulosis	Diverticulitis	Conservative	Recovered
51	F	Diverticulosis	Diverticulitis	Conservative	Recovered

of exclusion. However, these patients do form a fairly characteristic clinical group: the advanced age, the extensive diverticulosis, the almost invariable response to conservative measures, and the absence of any other demonstrable cause.

Severe Hypochromic Anaemia without Overt Bleeding

Two patients presented with severe hypochromic anaemia (haemoglobin 6·5 and 7·6 G. per 100 ml. respectively). Both were aged 80 years, and both had extensive diverticulosis on barium enema. Occult blood was present in the stools, and proctoscopy, sigmoidoscopy and barium-meal examinations revealed no other cause for the loss of blood. Both responded well to conservative measures. It is suggested that they fall into the same general category as the previous group.

Mild Bleeding

Of the 90 patients, 13 (15%) gave histories of mild rectal bleeding. Data concerning them are summarized in Table II and provide an interesting comparison with that of the group which bled massively. They are younger than the first group, the average age being 66 years as compared with 79 years. The clinical presentation was that of diverticulitis in 9 patients, while in only 4 was there no clinical evidence of inflammation of the colon. The barium-enema report was that of diverticulitis in all the cases, but, as will be discussed later, the clinical side is probably more important. Three patients were treated surgically, but in none of them was the bleeding the immediate reason for surgery.

(*To be continued*)

OFFICIAL ANNOUNCEMENTS : AMPTELIKE AANKONDIGINGS

FEDERAL COUNCIL

Notice is hereby given that a meeting of the Federal Council will be held in the Bacteriology Lecture Theatre, Medical School, Observatory, Cape, on 21, 22 and 23 September 1961, commencing at 9.30 a.m.

AGENDA

1. Notice convening the meeting.
2. Proxies.
3. Confirmation of minutes of previous meeting.
4. Matters arising out of the minutes.
5. Report of the Executive Committee.
6. Financial Statement by Honorary Treasurer.
7. Reports of other Committees.
8. Other business.
9. New notices of motion.

A. H. Tonkin
Secretary

Medical House
Cape Town
1 August 1961

ANNUAL GENERAL MEETING

Notice is hereby given that the Annual General Meeting of the Medical Association of South Africa will be held in the Bacteriology Lecture Theatre, Medical School, Observatory, Cape Town, on Friday, 22 September 1961, at 9.30 a.m.

AGENDA

1. Minutes.
2. Annual Report and Balance Sheet.
3. Election of Auditors.
4. Induction of President.
5. Other business.

At the conclusion of business, the meeting will be adjourned and reconvened at 8 p.m. on Monday 25 September 1961, in the City Hall, Cape Town, where, combined with the opening ceremony of Congress, the President will deliver his Presidential Address. Academic dress will be worn.

A. H. Tonkin
Secretary

Medical House
Cape Town
1 August 1961

FEDERALE RAAD

Kennis geskied hiermee dat 'n vergadering van die Federale Raad gehou sal word in die Lesingsaal vir Bakteriologie, Mediese Skool, Observatory, Kaapstad, op 21, 22 en 23 September 1961, begin 9.30 vm.

AGENDA

1. Kennisgewing wat die vergadering belê.
2. Volmagte.
3. Goedkeuring van notule van vorige vergadering.
4. Sake wat uit die notule voortvloei.
5. Verslag van die Uitvoerende Komitee.
6. Finansiële verslag van die Ere-Penningmeester.
7. Verslae van ander Komitees.
8. Ander sake.
9. Nuwe kennisgewings van voorstelle.

A. H. Tonkin
Sekretaris

Mediese Huis
Kaapstad
1 Augustus 1961

ALGEMENE JAARVERGADERING

Kennis geskied hiermee dat die Algemene Jaarvergadering van die Mediese Vereniging van Suid-Afrika gehou sal word op Vrydag, 22 September 1961, om 9.30 vm., in die Lesingsaal vir Bakteriologie, Mediese Skool, Observatory, Kaapstad.

AGENDA

1. Notule.
2. Jaarverslae.
3. Verkiesing van Ouditeure.
4. Inleiding van President.
5. Ander sake.

Na afhandeling van dié werksaamhede, word die vergadering verdaag en op Maandag 25 September 1961 om 8 nm. in die Stadsaal, Kaapstad, hervat, wanneer die openingsplegtigheid van die Kongres plaasvind en die President sy voorsittersrede sal lewer. Akademiese drag word gedra.

A. H. Tonkin
Sekretaris

Mediese Huis
Kaapstad
1 Augustus 1961

MINUTES OF SPECIAL MEETING OF FEDERAL COUNCIL

Following are the minutes of a Special Meeting of the Federal Council of the Medical Association of South Africa, held at Medical House, 5 Esselen Street, Johannesburg, on Friday 7 July 1961, commencing at 10.5 a.m.

Present:

Ex Officio: Dr. W. Chapman (President), Dr. J. H. Struthers (immediate past chairman), Mr. J. D. Joubert (Hon. Treasurer).

Border Branch: Drs. L. L. Alexander, J. K. McCabe, R. Schaffer.

Cape Eastern Branch: Dr. J. W. Gehle.

Cape Midland Branch: Dr. F. H. Counihan.

Cape Western Branch: Mr. R. D. H. Baigrie, Mr. J. A. Currie, Dr. T. J. Dry, Dr. F. E. Hofmeyr, Mr. P. C. W. Madden, Drs. A. G. Paterson, L. Slabbert, A. A. Zabow.

Eastern Transvaal Branch: Mr. D. E. Mackenzie, Drs. E. W. Turton, K. A. Gough.

Griqualand West Branch: Mr. N. Kretzmar.

Natal Coastal Branch: Drs. E. W. S. Deale, J. Duncan, N. R. Pooler, N. A. Rossiter, N. G. Steere.

Natal Inland Branch: Mr. B. A. Armitage.

Northern Transvaal Branch: Dr. J. T. M. de Villiers, Prof. O. V. S. Kok, Drs. W. H. Lawrance, P. N. Swanepoel.

O.F.S. & Basutoland Branch: Drs. J. Gilliland, R. Theron, G. F. C. Troskie, J. W. van der Riet.

O.F.S. Goldfields Branch: Dr. F. N. Gillwald.

Southern Transvaal Branch: Drs. C. Adler, A. L. Agranat, B. T. Bernstein, J. I. H. Frootko, R. Geerling, E. T. Meyer, M. Malk, H. I. Osler, F. W. Roberts, M. Shapiro.

South-West Africa Branch: Dr. J. Gant.

Soutpansberg Branch: Dr. I. S. Steyn.

Transkei Branch: Dr. H. M. Segall.

Vaal River Branch: Dr. C. G. S. van Heyningen.

Western Transvaal Branch: Drs. M. J. Meter, T. Radloff.

In Attendance: Dr. A. H. Tonkin (Secretary), Dr. P. D. Combrink (Assistant Secretary).

Owing to a breakdown in the airconditioning plant at Medical House, Council met for the morning session in the Harveian Theatre of the University of the Witwatersrand Medical School.

The Chairman, Dr. E. W. Turton, opened the meeting at 10.5 a.m. and welcomed the members.

1. *Notice Convening the Meeting,* published in the *Journal* of 1 July 1961, was taken as read. The Chairman referred to the notice convening the meeting and stated that the business would be 'to reconsider the policy of the Association in relation to insurance companies, medical aid societies and the Medical Services Plan, and matters ancillary thereto, and, if thought fit, to rescind, amend or modify any prior resolution thereon, and to lay down the future policy of the Association in regard to these matters'.

2. *Proxies and Apologies:* The Secretary stated that the following proxies had been received and were in order: Mr. B. A. Armitage to act for Dr. T. H. Whitsitt, Dr. F. Counihan to act for Dr. P. D. Beck, Mr. J. A. Currie to act for Dr. A. Landau, Mr. J. A. Currie to act for Dr. A. W. S. Sichel, Dr. J. T. M. de Villiers to act for Dr. W. A. Lombard, Dr. J. Gant to act for Dr. W. H. G. Kuschke, Dr. R. Geerling to act for Dr. T. Schneider, Dr. J. W. Gehle to act for Dr. L. R. L. Solomon, Dr. K. A. Gough to act for Dr. J. Q. Ochse, Dr. M. Malk to act for Dr. H. Penn, Dr. N. R. Pooler to act for Dr. A. Broomberg, Dr. H. M. Segall to act for Dr. E. R. Louw, Dr. N. G. Steere to act for Dr. A. B. Taylor, Dr. A. A. Zabow to act for Dr. N. Levy.

The following apologies for absence were recorded: Drs. D. L. Ferguson, J. Q. Ochse, J. H. L. Shapiro, A. W. S. Sichel, A. B. Taylor.

3. *Introduction of New Members.* At the request of the Chairman, new members and proxyholders were introduced by senior members of their Branches.

4. *Review of Policy.* The Chairman stated that it was his intention to call upon one of the requisitioners of the Special Meeting to address the Council in regard to the events which had led to the calling of a Special Meeting, but before doing so he wished to draw attention to the policy of the Association as contained in resolutions taken at Council meetings over the past few years. He referred to a memorandum prepared by the Secretary and then dealt with resolutions regarding medical aid societies, medical insurance companies, and the Medical Services Plan, commencing with the meeting held in September 1949.

He then invited one of the signatories of the requisition to address Council.

The invitation was accepted by Dr. M. Shapiro, and after some discussion it was proposed by Dr. Shapiro, seconded by Dr. Adler and *Resolved* 'That this Council proceed to review the policy of the Association in the light of the recognition granted to SANSOM'.

Following the tea interval, Dr. M. Shapiro addressed Council regarding the terms of the policies issued by SANSOM to its members. He asked permission of Council to table two schedules of fees paid to general practitioners by SANSOM. Council granted permission.

Dr. Shapiro then went on to explain the implications of the schedules which had been tabled.

In the discussion which followed, a number of proposals and counter-proposals were put forward.

Eventually it was *Agreed* at 1 p.m. that Council adjourn for lunch.

Following the lunch adjournment, the Chairman stated that he had decided that the policy of the Association should be reviewed in three portions — firstly in regard to medical aid societies, secondly in regard to the Medical Services Plan and lastly in regard to the medical insurance companies.

He then invited discussion regarding the Association's policy towards medical aid societies.

As a result of the discussion which followed, it was proposed by Dr. M. Shapiro, seconded by Dr. Alexander, 'That the policy of the Association be reviewed in the recognition of new medical aid societies in respect of (a) payment direct and in full by the Society to the doctor, (b) the ceiling limit of 20 visits or consultations for general practitioners, (c) that the benefits offered to the members shall merit the concession by the Association of the preferential tariff. That in respect of (a) a decision be taken at this meeting, and that in respect of (b) and (c) the matter be referred to the Central Committee for Contract Practice for consideration and report.'

An amendment was proposed by Dr. de Villiers, seconded by Dr. Lawrance, 'That this meeting endorses the present policy in regard to medical aid societies'.

A second amendment was proposed by Dr. Struthers, seconded by Prof. Kok, 'That this meeting endorses the present policy in regard to medical aid societies and recommends that the three points mentioned in Dr. Shapiro's resolution be referred to the Central Committee for Contract Practice for consideration and report'.

After further discussion Dr. de Villiers stated that with the permission of Council and of his seconder he was prepared to withdraw his amendment. Permission was granted.

Further discussion followed, and finally it was proposed by Dr. de Villiers, seconded by Dr. Osler, that the motion be now put. On being put to the vote, this proposal was *Carried.*

In accordance with Standing Order 60, Dr. M. Shapiro asked that the names of members voting for and against the amendment be recorded. Mr. Currie asked that voting be by pool and that proxy votes be allowed. Council *Agreed.*

The amendment proposed by Dr. Struthers and seconded by Prof. Kok was then put to the vote. Drs. Combrink and Zabow were appointed by the Chairman to act as scrutineers.

In due course the Chairman announced that the amendment had been *Carried* by 40 votes to 16. It was then put as the substantive motion and, by show of hands, it was *Carried* with 4 dissentient votes.

Members voting for the amendment were: Dr. Agranat, Mr. Armitage, Mr. Baigrie, Dr. Beck (proxy), Dr. Chapman, Mr. Currie, Drs. Deale, de Villiers, Dry, Duncan, Geerling, Gilliland, Hofmeyr, Mr. Joubert, Prof. Kok, Mr. Kretzmar, Drs. Kuschke (proxy), Landau (proxy), Lawrance, Lombard (proxy), Mr. Mackenzie, Drs. McCabe, Ochse (proxy), Osler, Paterson, Penn (proxy), Rossiter, Schaffer, Schneider (proxy), Sichel (proxy), Slabbert, Solomon (proxy), Steyn, Struthers, Swanepoel, Troskie, Turton, Theron, van der Riet, van Heyningen.

Those voting against the amendment were: Drs. Adler, Alexander, Bernstein, Broomberg (proxy), Frootko, Gillwald, Levy (proxy), Louw (proxy), Meter, Meyer, Pooler, Radloff, Roberts, M. Shapiro, Taylor (proxy), Zabow.

The Chairman then indicated that discussion would take place regarding the Medical Services Plan.

It was proposed by Dr. de Villiers, seconded by Dr. Lawrance, 'That this meeting approves of the Medical Services Plan, but is opposed to the principle of pro-rating included in its Constitution'.

Considerable discussion followed, during which Council adjourned for tea.

After the tea interval, an amendment was proposed by Dr. Schaffer, seconded by Mr. Armitage, 'That the Medical Services Plan continue to enjoy the sponsorship and support of the Association, and that Council invite the Plan to extend its operation to other areas if the Board finds it possible to do so'.

After much further discussion the amendment proposed by Dr. Schaffer and Mr. Armitage was put to the vote and was *Carried*.

Dr. M. Shapiro asked that the votes recorded for and against the amendment be noted in the Minutes.

Members voting for the amendment were: Drs. Bernstein, Zabow, Roberts, Meyer, Mr. Currie, Mr. Armitage, Drs. Malk, Geerling, Mr. Kretzmar, Dr. Frootko, Dr. Hofmeyr, Mr. Madden, Drs. Gant, Slabbert, M. Shapiro, Alexander, Adler, Segall, van der Riet, Gilliland, Steyn, Gehle, Meter, Radloff, Steere, Pooler, Duncan, Deale, Rossiter, Gillwald, Dry, van Heyningen, Paterson, McCabe, Gough, Counihan, Agranat, Schaffer, Chapman, Turton.

Those voting against the amendment were: Drs. Theron, de Villiers, Lawrance, Swanepoel.

The amendment was then put as the substantive motion and was *Carried Nem. Con.*

The Chairman stated that discussion would continue and that it would centre round the Association's policy in regard to the insurance companies.

A resolution proposed by Dr. de Villiers, seconded by Dr. Struthers, was tabled, reading: 'That this meeting endorses the policy with regard to insurance companies, and recommends that the Central Committee for Contract Practice investigate and correct such irregularities as exist in this regard'.

After some discussion an amendment was proposed by Dr. Shapiro, seconded by Dr. Adler, 'That this Council instructs the Central Committee for Contract Practice to re-examine the agreement with SANSOM so as to ensure that the conditions of their contracts with their subscribers and of their relationships with the profession are acceptable to the Association, and to report on their investigations at the next meeting of Council'.

After further discussion the amendment was put to the vote and *Carried Nem. Con.* It was then put as the substantive motion and was *Carried Nem Con.*

The question arose as to whether it would be possible for the Central Committee for Contract Practice to deal with these matters before the next meeting of Council, and Dr. Struthers assured the Council that it would be possible.

Discussion ensued regarding the possibility of the Board of the Medical Services Plan being able to render assistance to the Central Committee for Contract Practice at any time. On the suggestion of the Chairman, Council *Agreed* that a request from Council go to the Chairman of the Central Committee for Contract Practice to ask a representative of the Plan to be available to his Committee, should it be considered necessary.

5. *15th General Assembly of World Medical Association, Rio de Janeiro, September 1961:* The Chairman stated that the Executive Committee recommended to Council that this matter be dealt with as one of urgency. Council *Agreed* unanimously.

The Chairman then submitted a recommendation from the Executive Committee that Dr. P. D. Combrink be the Association's official delegate at the 15th General Assembly of the World Medical Association, and that Dr. R. Schaffer be the alternate representative if he should find it possible to attend.

An amendment was proposed by Dr. M. Shapiro, 'That Dr. Schaffer be appointed as the Association's representative, and that if he is not able to attend the meetings of the World Medical Association the Executive Committee should depute an official of the Association to be the official delegate'.

On being put to the vote, the amendment was *Carried* by 24 votes to 18. It was then put as the substantive motion and was *Carried*.

6. *Message to Secretary General, World Medical Association:* The Chairman proposed, as an unopposed motion, that a message of congratulation be sent to Dr. H. S. Gear on his appointment as Secretary General of the World Medical Association. *Carried* with acclamation.

7. *Message from Dr. H. Penn:* The Chairman referred to a cablegram which had been received from Dr. Penn conveying good wishes for a successful meeting. *Noted.*

8. *Thanks:* The Chairman thanked the Southern Transvaal Branch for the use of the Hall, and expressed appreciation to the ladies of the Branch who had served refreshments.

A note of thanks to the Chairman for his conduct of the meeting was proposed and *Carried* with acclamation.

The meeting ended at 6.45 p.m.

IN MEMORIAM

BENJAMIN FINE, M.R.C.S. (ENG.), L.R.C.P. (LOND.)

Dr. C. B. Collins, of Port Elizabeth, writes:

Dr. Benjamin Fine died in his sleep on 11 June 1961 at the early age of 54. He died as he had lived, quietly and unobtrusively.

By his colleagues and his patients he will be sadly missed and always remembered as a kind and gentle man whose first consideration was always his patients and his work.

Dr. Fine

Dr. Fine graduated in London in 1930, obtaining his M.R.C.S. and L.R.C.P. After working in Edinburgh he practised in Springs in the Transvaal for a number of years. He left Springs 16½ years ago to come to Port Elizabeth where he was resident until his untimely death.

It was with much regret that, after a period of ill health, he was compelled to retire from general practice in 1959. He then joined the Port Elizabeth Municipal Health Service where he helped to establish a very vital non-European Health Clinic. He ran this clinic until the day of his death. The presence of a large number of his non-European nursing staff at his funeral was evidence of the very high esteem in which he was held by all sections of the community.

During his life he took an active interest in Masonic affairs and was Master of his Lodge in Port Elizabeth in 1958.

Our heartfelt sympathies go out to his widow and son, Dr. Stuart Fine.

PASSING EVENTS : IN DIE VERBYGAAN

South African Institute for Medical Research, Johannesburg, Staff Scientific Meeting. The next meeting will be held on Monday 21 August at 5.10 p.m. in the Institute Lecture Theatre. Professor J. F. Murray will speak on 'Kaposi's sarcoma, a review of the UICC symposium 1961'.

* * *

Mr. A. Lewer Allen, of Durban, has commenced practice in association with Mr. J. F. P. Mullins and Mr. J. Fogel, orthopaedic surgeons, at 1100 Mansion House, Field Street, Durban. Telephones: Rooms 62845, 60630; residence 878251.

Dr. A. Lewer Allen, van Durban, wens sy kollegas mee te deel dat hy in die praktyk van dr. J. F. P. Mullins en dr. J. Fogel, ortopediese chirurge, aangesluit het te 1100 Mansion Huis, Fieldstraat, Durban. Telefone: Kamers 62845, 60630; woning 878251.

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South African Paediatric Association (M.A.S.A.), Natal Sub-Group. There will be a clinical meeting of this Sub-group at 8 p.m. on Tuesday 22 August at Greys Hospital, Pietermaritzburg.

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Dr. Cyril Ross. It is with regret that we learn that Dr. Cyril Ross of Pretoria, who is visiting postgraduate dermatological clinics in England and Israel, has suffered a coronary thrombosis. He has been admitted to the London Clinic, and it is unlikely that he will return to the Republic before the end of September.

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Dr. J. J. de Wet, M.R.C.O.G., F.C.O.G. (S.A.), praktiseer vanaf 1 Augustus 1961 te Groote Kerk-gebou, Kaapstad, en Bellville Mediese Sentrum, Bellville, as ginekoloog en verloskundige in vennootskap met dr. Rhoderic W. A. Nel.

* * *

University of Cape Town and Association of Surgeons of South Africa (M.A.S.A.), Joint Lectures. The next lecture in this series will be held on Wednesday 16 August at 5.30 p.m. in the E-floor Lecture Theatre, Groote Schuur Hospital, Observatory, Cape. Mr. H. Katz will speak on 'Follow-up of 200 cholecystectomy cases with special reference to choledochotomy'. All members of the Medical Association are welcome to attend this lecture.

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Margaret Orford Gedenklesing 1961: Die Raad van die Kollege van Interniste, Chirurge en Ginekoloë van Suid-Afrika kondig aan dat prof. O. S. Heyns, Professor van Obstetrie en Ginekologie, Universiteit van die Witwatersrand, en Lektor vir 1961 vir die Margaret Orford Gedenkfonds, 'n lesing getitel 'A device to improve foetal oxygenation' op die onderstaande datums en vergaderplekke sal lewer:

Johannesburg: Dinsdag 22 Augustus 1961 om 8.15 nm., Harveian Lesingsaal, Kliniese-gebou, Mediese Fakulteit.

Pretoria: Donderdag 24 Augustus 1961 om 8.15 nm., Boonste Lesingsaal, Kliniese-gebou, Mediese Fakulteit.

Margaret Orford Memorial Lecture 1961: The Council of the College of Physicians, Surgeons and Gynaecologists of South Africa announces that Prof. O. S. Heyns, Professor of Obstetrics and Gynaecology, University of the Witwatersrand, and Lecturer for 1961 for the Margaret Orford Memorial Fund, will deliver a lecture entitled 'A device to improve foetal oxygenation' on the dates and venues as follows:

Johannesburg: Tuesday 22 August 1961, at 8.15 p.m., Harveian Lecture Theatre, Clinical Building, Medical Faculty.

Pretoria: Thursday 24 August 1961, at 8.15 p.m., Top Lecture Theatre of the Medical Faculty.

* * *

Maurice Weinbren Award in Radiology. This award (which is made annually for a paper of sufficient merit) consists of the sum of R50.00 together with a certificate. The Award for 1959 was made to Dr. Eric Samuel for his paper entitled 'The use of contrast media in the investigation of the acute abdomen', which was published in *The British Journal of Radiology,* 1960, vol. 33, no. 386, pp. 82 - 91. The Award for 1960 was made to Drs. Josse Kaye and R. Glyn Thomas for their paper entitled 'The problem of abnormal radiological lung patterns', which was published in *Medical Proceedings,* 1960, vol. 6, no. 15, pp. 323 - 332.

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Dr. de Wet Vorster, M.B., Ch.B. (Cape), D.P.M. (Eng.), Diploma in Psychiatry (McGill) joined Dr. G. J. Goldberg, D.P.M., M.R.C.P. in psychiatric practice on 7 August at 404 Osler Chambers, Jeppe St., Johannesburg, telephone 239795. Dr. Vorster held psychiatric posts at the Montreal General Hospital, Canada, Child Guidance Clinics and Student Health psychotherapy centres in the USA, as well as appointments at psychiatric hospitals in Britain.

Dr. De Wet Vorster, M.B., Ch.B. (Kaapstad), D.P.M. (Eng.), Diploma Psigiatrie (McGill), het op 7 Augustus in die praktyk getree saam met dr. G. J. Goldberg, M.R.C.P., D.P.M. te 404 Osler Chambers, Jeppestraat, Johannesburg, telefoon 239795. Dr. Vorster het aanstellings beklee by die Montreal Algemene-hospitaal, Kanada, Kinderleiding klinieke en Studentewelsyn psigoterapie sentrums in die V.S.A., sowel as aanstellings by psigiatriese inrigtings in Brittanje.

* * *

The Midland Medical Plan has been launched by the Cape Midlands Branch at Port Elizabeth, on the lines of, and with the help of the Medical Services Plan. The organizers are awaiting formal registration as a Friendly Society. Their offices are at Cunningham Court, Russel Road, Port Elizabeth. The first Board of Directors consists of Mr. F. H. Counihan, Chairman, Drs. A. P. Albert, G. L. Becker, L. W. Finnemore, P. Jabkovitz, A. Kessler, J. Lee, L. M. Satchwell, and A. S. Weir.

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Somerset Hospital, Monthly Clinical Evening, will be held on Tuesday 15 August at 8.15 p.m. in the Nurses' Main Lecture Hall, Somerset Hospital, Green Point. All those interested are invited to attend this meeting.

SOUTH AFRICAN MEDICAL CONGRESS, CAPE TOWN

ENTERTAINMENTS : KASKENADES AND CALTEX SHOW

On Tuesday 26 September a double programme of Kaskenades is being presented. On Thursday 28 September, as an alternative to the Banquet, the Caltex Show will be similarly presented.

Members who wish to attend either show (free of charge) must let Congress Office (P.O. Box 643, Cape Town) know definitely on or before 12 September 1961. Please pay strict attention to this.

BOOK REVIEWS : BOEKBESPREKINGS

NEUROLOGICAL COLLOQUIUM

Scientific Aspects of Neurology. Leeds Neurological Sciences Colloquium 1959 - 60. Edited by Hugh Garland, T.D., M.D., F.R.C.P. Pp. xi+264. R5.00. Edinburgh and London: E. & S. Livingstone Ltd. 1961.

The editor of this book, who works in Leeds, had the very bright idea of inviting distinguished neurologists and workers in related fields to deliver lectures on various aspects of neurology. Now the many who were unable to be present are given the opportunity to benefit from this excellent plan.

Twenty different lectures are published here, many of them illustrated with figures, diagrams and photographs, and one can take up the book, concentrating on the topics of special personal interest, browsing through others and gaining a good idea of much recent work in neurology. Needless to say, not all the contributions are of equal merit, and while it may be invidious to select items from the collection, one can mention some of particular interest and importance, often because of the way they are written. The writings of Walshe, Symonds, Critchley and Geoffrey Jefferson are always a delight and a profit to read; other important lectures like Hill's on the epileptogenic focus and McKissock's on the treatment of posterior communicating aneurysms are alone almost worth the price of the book.

I would recommend it not only to the neurologist, but also to his medical colleagues, and especially the trainee physician.

S.B.

FRACTURES AND DISLOCATIONS

Fractures, Dislocations and Sprains. By Philip Wiles, M.S. (Lond.), F.R.C.S. (Eng.), F.A.C.S. Pp. 67. 519 illustrations. R2.75 net. London: J. & A. Churchill Ltd. 1960.

This book (67 pages, each 10×12 inches) is practically a concise and handy atlas on fractures and dislocations of nearly every type. It is the outcome of accumulated information on fractures and dislocations formerly set out in card form in the Orthopaedic Fracture Department of the Middlesex Hospital. The format allows the illustration, identification, and discussion of fractures and dislocations in each region. Excellent X-ray photographs appear on the left hand, while smaller, clear line-drawings are printed on the right-hand pages, together with brief discussions on type, mechanism, diagnosis, treatment, and complications likely to follow.

The book starts with a short discussion on the healing, classification, treatment, and complications likely to be met after various fractures and dislocations. The author points out that fractures are the main theme while dislocations receive brief discussion. The treatment suggested is that favoured by the author—a sensible approach which tends towards conservatism. The illustrations are such as to render lengthy description unnecessary, for they are exceptionally clear and simple.

The work is well planned, well illustrated, clearly written and to the point. The book is strongly bound and will withstand much handling. It should prove of great use to students, housemen, first-aid workers and even those general practitioners who find themselves confronted with fracture cases away from hospital facilities.

G.C.A.vdW.

PSYCHIATRIC DRUG THERAPY

The Dynamics of Psychiatric Drug Therapy. Edited by G. J. Sarwer-Foner, M.D. Pp. xxviii+624. R12.80. Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1960.

This book contains the proceedings of a conference on psychodynamic, psychoanalytic and sociological aspects of the neuroleptic drugs in psychiatry, held under the auspices of the Department of Psychiatry of McGill University, Montreal. A number of experts formed small selected groups with limited terms of reference, and all the leisure they needed to go into these topics and each other's views in detail. They cover both the physiological and the psychological effects of the new 'drugs for the mind', particularly the latter aspect, and deal with subjects such as the psychodynamic meaning of these drugs for patients, the way their effects are integrated with other methods of influencing abnormal behaviour, such as psychotherapy and milieu therapy, transference and counter-transference, problems of drug administration, the reactions of staff to the new drugs, etc. Although the issues are not necessarily finalized, much new information and interesting discussion emerges. This is a timely book on a subject that badly needs authoritative comment and elucidation, and from it the psychiatrically-interested reader will gain a thoroughly up-to-date and comprehensive grasp of the subject.

L.S.G.

PAEDIATRICS

The Catarrhal Child. By John Fry, M.D. F.R.C.S. Pp. viii+139. R2.50. London and South Africa: Butterworth and Co. 1961.

This is a very readable account of well-controlled research in general practice.

Over a period of 10 years John Fry, an exceptional family doctor, carefully observed the children in his busy daily practice in order to establish the natural history of coughs and colds, sore throats, otitis media, and wheezy chests. His statistics show a definite age pattern with a natural tendency to outgrow these ills at about 8 years of age. Similarly, he presents his conclusions on acute chest infections and his assessment of the 'T and A's' problem. There is also a thought-provoking chapter on the use (and abuse) of antibiotics.

A little more space could have been devoted to sorting out the respiratory allergies and to virus infections, but the author's clinical concept of a 'Catarrhal child syndrome' is quite convincing.

This book should have a wide appeal to paediatricians, to ENT surgeons, to those in charge of school clinics and welfare clinics, and above all to the general practitioner. Even the busiest of them could find time to read the excellent summaries at the end of each chapter—their little patients would benefit.

Dr. Fry must have made considerable sacrifices to complete this study. He deserves an accolade.

L.S.

GASTRO-ENTEROLOGY

Clinical Gastroenterology. By F. Avery Jones, M.D. (Lond.), Hon. M.D. (Melbourne), F.R.C.P. (Lond.) and J. W. P. Gummer, M.S. (Lond.), F.R.C.S. (Eng.). Pp. vii + 652. Illustrated. R7.00 Oxford: Blackwell Scientific Publications. 1960.

This book, based on the practice of gastro-enterology at the Central Middlesex Hospital, London, provides an authoritative text-book on clinical gastro-enterology. The main emphasis is on the diagnosis and management of diseases and recognized disorders of the gastro-intestinal tract. The spastic-colon syndrome, duodenal ileus and other less clearly defined disorders receive scant attention, and the authors do not offer a diagnostic approach to the difficult problem of the patient with chronic abdominal symptoms unassociated with evidence of organic disease. These are minor criticisms in a book dealing with as wide a subject as gastro-enterology, and do not detract from its value as a standard text-book for undergraduate and postgraduate alike.

I.N.M.

ENDEMIC GOITRE

Endemic Goitre. By F. W. Clements, *et al*. Pp. 471. R4.00. Also available in French and Spanish. Geneva: World Health Organization. South African Office: Van Schaik's Bookstore (Pty.) Ltd., P.O. Box 724, Pretoria. 1960.

It is estimated that almost 200 million of the world's inhabitants suffer from goitre. A large chapter of this volume traces the prevalence and geographical distribution of this disease throughout the world. The survey published by the South African Goitre Research Committee in 1955 is cited to indicate our own national problem in this regard.

Excellent contributions consider physiological, pathological and aetiological factors in the genesis of goitre, and the technique of conducting a goitre survey is reviewed. The outstanding value of the monograph, however, lies in its emphasis on goitre control and prevention.

Amazing reductions in the incidence of the disease have been achieved by iodization of salt or water supplies in some countries. WHO, in publishing this book, is pointing the way to complete elimination of the problem of endemic goitre.

Apart from its obvious importance in the field of public health, this volume contains a great deal of scientific information that will interest all who are concerned with the thyroid gland.

R.H.